

GENERAL CATALOG

2014-2015



Oregon State
UNIVERSITY

Please note:

Custom copies of the *OSU General Catalog* may be printed by going to <http://catalog.oregonstate.edu/>. Go to the section you want a hard copy of and click the Print Version icon and follow the subsequent instructions.

Or to print out a PDF of a printed version of the *OSU General Catalog*, go to the the online catalog link above and click on Archives of Catalogs & Schedules of Classes, then click on OSU Archives of General Catalogs in PDF.

OSU Printing and Mailing offers printed catalogs via a print-on-demand service. To order, visit <http://printmail.oregonstate.edu/>.

Other sources of information about Oregon State University include the *Summer Term Planning Guide*, distributed by the Summer Session Office and online at <http://summer.oregonstate.edu/>; and the *Viewbook*, available through the Office of Admissions. All of these bulletins are free.

The address for all campus offices:

Oregon State University
Corvallis, Oregon 97331

University telephone information: 541-737-0123 or
541-737-1000

Admission information: 541-737-4411

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B102 Kerr Administration Building, Corvallis, OR 97331-2130.

CATALOG YEAR POLICY**Graduation Requirements/Catalog Contract Policy**

When determining the graduation requirements for a given student:

- Students must meet all applicable degree requirements from the published catalog(s).
- The student's catalog year for institutional and baccalaureate core requirements is established by his or her first term of attendance (matriculation date) at Oregon State University as an admitted student.
- The student's catalog year for college/major/option/minor requirements is based on the date of declaration of the major/option/minor; consequently, a student's first (primary) major/option must be in the same catalog year. If a primary option is declared in a subsequent academic year, the primary option will be aligned with the catalog year of the primary major. If the primary option did not exist in the catalog year of the primary major, the primary major will roll forward to the catalog year of the primary option.
- Additionally, while the student's first major/option must be in the same catalog year, any additional declarations of majors/options/minors will be determined by the declaration dates (and corresponding catalog years) established by the change of academic program process. A student, in collaboration with an advisor, can also choose to graduate under a subsequent (to their most recent major declaration date) catalog year within the same major/option.
- At the time of graduation, all students, including transfer students, must use a catalog that is not more than ten years old. Students may petition to the head advisor of their college for an extension of a catalog greater than ten years prior to their expected graduation term.
- Current OSU policy requires a student to reapply after not enrolling at OSU for four consecutive terms (not including summer terms); the published catalog for the

resulting readmission/matriculation date will become the catalog of record for graduation requirements. The Planned Educational Leave Program defined in AR 13.d beginning with the 2011–2012 academic year, provides a mechanism for a student to sustain their original catalog of record during a planned absence.

- For Degree Partnership Program students, the first term the student is admitted to OSU will be the matriculation date and will determine the catalog year for institutional and baccalaureate core requirements. The catalog year for college/major/option/minor requirements will be the same as all other OSU students.
- Every effort has been made to ensure the accuracy of information in the OSU General Catalog. However, Oregon State University or the Oregon State Board of Higher Education may find it necessary from time to time to make changes in courses, curricula, or degree requirements. Students already admitted to a program in which such changes have been made will be reasonably accommodated, if possible, to ensure their normal progress toward a degree. A student may, however, still be required to conform to changes in courses, curricula, or degree requirements as deemed necessary by Oregon State University or the State Board of Higher Education.

Note: OSU is on a term (quarter credit) system. When transferring in course work from semester system institutions, multiply the number of credits by 1.5 to see how many quarter credits will be transferred (3 semester hours x 1.5 = 4.5 quarter credits). If you are planning to transfer OSU credits out to a semester system institution, multiply the number of quarter credits by .67 to find out how many credits will transfer (4 quarter credits x .67 = 2.68 semester credits).

OSU'S POLICY REGARDING UNAUTHORIZED PEER-TO-PEER (P2P) FILE SHARING AND OTHER COPYRIGHT INFRINGEMENT**Institutional policies and sanctions related to the unauthorized distribution of copyrighted material:**

The University takes copyright infringement seriously. As set forth in the Acceptable Use of University Computing Resources policy (located at <http://oregonstate.edu/aup.htm>), all students must abide by federal and state copyright laws when using University computing or network resources. The unauthorized publishing or use of copyrighted material on the University computer network is strictly prohibited and users are personally liable for the consequences of such unauthorized use. This specifically applies to Peer-to-Peer or P2P file-sharing of copyrighted music and movies. Students should be aware that by engaging in unauthorized sharing of copyrighted material, they not only violate University policy, but they may also be held criminally and civilly liable by federal and/or state authorities.

Under current copyright law, criminal cases of copyright violation carry a penalty of up to five (5) years in prison and a \$250,000 fine. Civil penalties for copyright infringement include a minimum fine of \$750 for each work. Oregon State University will subject students who violate this policy to discipline as appropriate. For a first-time violation of this copyright policy, students are required to pass a copyright quiz within 72-hours or else their network access is disabled. Repeated infringement is subject to disciplinary action by the Office of Student Conduct and Community Standards, up to and including expulsion from the University.

Catalog Coordinator: Larry M. Bulling

Meeting the Needs of Oregon—and the World

Focusing on its current strengths and future potential, Oregon State University fosters exceptional educational, research, and outreach initiatives that sustain human well being and improve the quality of human life. Acting on this imperative requires understanding diverse, complex interactions among population, demographics, human health, climate, access to natural resources (including safe food, clean water and air, and wood products), sustainability, economic vitality, cultural diversity, and new technologies, among others. Well-being and quality of life are likewise enhanced by the fine and performing arts and the humanities and social sciences, which promote understanding and improvement in human interactions within and across cultures.

A successful response to this imperative requires OSU to meet two commitments: 1) OSU will lead in develop-

ing a globally competitive workforce and an informed and capable citizenry; and 2) OSU will address multifaceted national and global challenges that resist simple technical or social solutions.

Three Signature Areas of Distinction, informed by the university's two commitments, provide OSU a competitive edge, a stronger assertion of institutional identity nationally and internationally, and the greatest possible opportunity to have a positive impact throughout the state, nation and world. These three areas are:

- Advancing the Science of Sustainable Earth Ecosystems
- Improving Human Health and Wellness
- Promoting Economic Growth and Social Progress



Students Come First

- **OSU is committed to diversity.** Our students come from all walks of life and from all over the world. And they enter Oregon State with the highest high school GPA of any school in the Oregon University System.
- OSU offers a full range of **scholarships, grants, work-study, and loans** from federal, state, and university sources. We will help you get the best possible financial aid package.
- **OSU CONNECT**, a five-day orientation program before the start of fall term, helps students adjust to campus life. Activities include new student convocation, welcome receptions, interactive workshops with students and professors, and many other educational and social activities geared toward connecting new students to the university and Corvallis.
- Our **First-Year Experience** program helps new students transition into university life. A variety of small-group experiences are offered (such as OSU U-Engage, a student orientation course) to connect first-year students to faculty, current OSU students, and other new students.
- The **University Exploratory Studies Program** allows students to explore a variety of disciplines before choosing an academic major.
- Our **Intercultural Student Services office, cultural centers, and Educational Opportunities Program** work with African American, Hispanic American, Asian American, and Native American students to ensure that their OSU experience is positive.
- Oregon State is the only college or university in the state that offers **ROTC programs** for all four services—Air Force, Army, Marines, and Navy.
- With more than **300 student organizations, plus club, intramural, and Pac-12 Conference sports**, students find it easy to keep busy at OSU.



OSU's Campus—Is the State of Oregon

- The **OSU Extended Campus** office offers an extensive range of distance education services and bachelor's degree programs throughout Oregon.
- The **OSU Extension Service** provides services in all 36 Oregon counties.
- Corvallis is an ideal **university town** of 54,000 people, offering a wide range of community, religious, dining, shopping, and cultural opportunities. And the city is just an hour or two from the **Oregon Coast, the snow-capped Cascade Mountains, and Portland**—Oregon's largest city.



MISSION

Preamble

Oregon State University is a comprehensive, public, internationally recognized research university. As one of only two land, sea, space and sun grant universities in the country (Cornell being the second), OSU offers programs and employs faculty and staff in every county of the state. OSU views the state of Oregon as its campus, and works in partnership with all of Oregon’s community colleges and the state’s public and private colleges and universities to serve Oregonians’ educational needs.

Mission

As a land grant institution committed to teaching, research, and outreach and engagement, Oregon State University promotes economic, social, cultural and environmental progress for the people of Oregon, the nation and the world. This mission is achieved by producing graduates competitive in the global economy, supporting a continuous search for new knowledge and solutions, and maintaining a rigorous focus on academic excellence, particularly in the three Signature Areas:

Advancing the Science of Sustainable Earth Ecosystems; Improving Human Health and Wellness; and Promoting Economic Growth and Social Progress.

Vision

To best serve the people of Oregon, Oregon State University will be among the Top 10 land grant institutions in America.

Goals

1. Provide outstanding academic programs that further strengthen performance and pre-eminence in the three Signature Areas of Distinction: Advancing the Science of Sustainable Earth Ecosystems; Improving Human Health and Wellness; and Promoting Economic Growth and Social Progress.
2. Provide an excellent teaching and learning environment and achieve student access, persistence and success through graduation and beyond that matches the best land grant universities in the country.



3. Substantially increase revenues from private fundraising, partnerships, research grants, and technology transfers while strengthening our ability to more effectively invest and allocate resources to achieve success.

Core Values

Accountability. We are committed stewards of the loyalty and good will of our alumni and friends and of the human, fiscal, and physical resources entrusted to us.

Diversity. We recognize that diversity and excellence go hand-in-hand, enhancing our teaching, scholarship, and service as well as our ability to welcome, respect, and interact with other people.

Integrity. We practice honesty, freedom, truth, and integrity in all that we do.

Respect. We treat each other with civility, dignity, and respect.

Social responsibility. We contribute to society's intellectual, cultural, spiritual, and economic progress and well-being to the maximum possible extent.



Source: OSU Strategic Plan.



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FALL 2014

Priority registration:

Phase 1, Sunday, May 18, 2014

Phase 2 with wait listing, June 5–October 5

START: Summer advising and registration program for new undergraduates. Requires paid \$200.00 advance tuition deposit.

Off-Campus Students:

Alaska, June 6; California, June 14–15; Hawaii, June 21

On-Campus First-Year Students:

June 23–24; June 26–27; July 7–8; July 14–15; July 17–18; July 21–22; July 24–25; Aug. 25–26
(START Bilingüe), June 29–30

On-Campus Transfer Students:

July 1; July 11; July 23; Aug. 27

Continuing registration and course add/drop with wait listing,

June 5–October 5

Verification of enrollment begins,

September 19

OSU Connect:

New student fall orientation,
International students: Sept. 22

First Year & Transfer students: Sept. 24

CONNECT events:

Sept. 25–28

Classes begin, Monday, September 29

Late registration begins (\$50 late fee assessed),

Monday, September 29

Last day to add a class by Web without departmental approval,

Sunday, October 5

Tuition bills emailed to ONID accounts,

October 5, due October 31

Second week adds by Web with departmental approval,

October 6–10

Audit registration period

(Requires instructor approval; tuition and fees assessed), October 6–10

Deadline to Apply Online for Graduation (Fall Term),

October 10

Last day to drop a class by Web,

11:55 p.m., Friday, October 10

Last day to register or add a class by Web

(Requires departmental approval), 5 p.m., Friday, October 10

Late registration fee increases to \$100,

October 14 through December 5

Last day to change to or from S/U grading

(Requires approval of academic advisor/dean), 5 p.m., Friday, Nov. 14

Last day to withdraw from a course by Web.

(W grade entered on transcript) 11:55 p.m., Friday, November 14

Thanksgiving Holiday

(University holiday), November 27–28

Last day for total withdrawal from the university

(W grade for each registered course), 5 p.m., Friday, December 5

Dead week,

December 1–5

Finals week,

December 8–12

End of term,

Friday, December 12

Final grades due in Registrar's Office,

5 p.m., Monday, December 15

MyDegrees not refreshing, Dec. 15–16

Grades available on Web, December 17

MyDegrees not refreshing, Jan. 6–7, 2015

WINTER 2015

Priority registration:

Phase 1, Starts Sunday, Nov. 16, 2014

Phase 2 with wait listing, December 4, 2014, ends January 11, 2015

Verification of enrollment begins,

December 18, 2014

Classes begin, Monday, January 5, 2015

Late registration begins (\$50 late fee assessed),

January 5–18

Tuition bills emailed to ONID

accounts, January 4, due January 31

Last day to add a class by Web without departmental approval,

Sunday, January 11

Second week adds by Web with departmental approval,

Monday–Friday, January 12–16

Audit registration period

(Requires instructor approval; tuition & fees assessed), January 12–16

Deadline to Apply Online for

Graduation (Winter Term), January 16

Last day to drop a class by Web,

11:55 p.m., Friday, January 16

Last day to register or add a class by Web

(Requires departmental approval), 5 p.m., Friday, January 16

Martin Luther King, Jr. Day observed:

No Classes, Monday, January 19

Late registration fee increases to \$100,

Tuesday, January 20

Last day to change to or from S/U Grading

(Requires approval of academic advisor/dean), 5 p.m., Friday, February 20

Last day to withdraw from a course by Web

(W grade entered on transcript) 11:55 p.m., Friday, February 20

Last day for total withdrawal from the university for the term

(W grade for each registered course), March 13

Dead week,

March 9–13

Finals week,

March 16–20

End of winter term,

Friday, March 20

Final grades due in Registrar's Office,

5 p.m., Monday, March 23

MyDegrees not refreshing,

March 23–24

Grades available on Web,

March 25

Spring Break,

March 23–March 27

MyDegrees not refreshing,

March 30–31

SPRING 2015

Priority registration:

Phase 1, Starts Sunday, Feb. 22, ends

Thursday, March 12

Phase 2 with wait listing, Starts

Thursday, March 12, ends April 3

Verification of enrollment begins,

March 30

Classes begin, Monday, March 30

Late registration begins

(\$50 late fee assessed), March 30–April 12

Tuition bills emailed to ONID accounts,

April 5, due April 30

Last day to add a class by Web without departmental approval,

Sunday, April 5

Second week adds by Web with departmental approval,

April 6–10

Audit registration period

(Requires instructor approval; tuition and fees assessed, Monday–Friday, April 6–10

Deadline to Apply Online for Graduation (Spring Term),

April 10

Last day to drop a class by Web,

11:55 p.m., Friday, April 10

Last day to register or add a class by Web

(Requires departmental approval), 5 p.m., Friday, April 10

Late registration fee increases to \$100,

Monday, April 13

Last day to change to or from S/U grading

(Requires approval of academic advisor/dean), 5 p.m., Friday, May 15

Last day to withdraw from a course by Web

(W grade entered on transcript), 11:55 p.m., Friday, May 15

Memorial Day Holiday,

May 25

Last day for total withdrawal from the university for the term

(W grade for each registered course), Friday, June 5

Dead week,

June 1–5

Finals week,

June 8–12

End of term,

Friday, June 12

Commencement, Saturday, June 13

Final grades due in Registrar's Office,

5 p.m., Monday, June 15

MyDegrees not refreshing,

June 15–16

Grades available on Web,

June 17

MyDegrees not refreshing,

June 22–23

SUMMER 2015

Summer Session Planning Guide available, March 11

Web registration begins, April 12

Verification of enrollment begins, June 24

(Session 6) Inter-session/Zero-week, June 15–June 19

(Session 1) 11-week session, June 22–Sept. 4

(Session 2) First 4-week session, June 22–July 17

(Session 3) 8-week session, June 22–Aug. 14

Deadline to Apply Online for Graduation Degree Audit (Summer Term),

July 3

Holiday: Independence Day,

July 3 (Friday; no classes)

(Session 4) Second 4-week session, July 20–August 14

(Session 5) 3-week session, Aug. 17–Sept. 4

Holiday: Labor Day,

Sept. 7 (Monday)

OSU is on a Term (Quarter Credit) system.

When transferring in course work from semester system institution, multiply the number of credits by 1.5 to see how many quarter credits will be transferred (3 semesters x 1.5 = 4.5 quarter credits). If you are planning to transfer OSU credits out to a semester system institution, multiply the number of quarter credits by .67 to find out how many credits will transfer (4 quarter credits x .67 = 2.68 semester credits).

Academic Advising

OSU recognizes that quality academic advising is integral to the academic development and well-being of students. Quality academic advising includes both the prescriptive elements of advising (assisting with course selection, maintaining curriculum checklists, tracking degree progress and completing degree audits, etc.) and the developmental aspects of advising (major and career decision making, integration in campus and academic cultures, assistance with and referrals surrounding issues affecting a student's academic success, etc.).

While each college has developed an advising system sensitive to the needs of its academic disciplines and departments, there is consistency in that each also has a head advisor. Undeclared students receive advising through the University Exploratory Studies Program (UESP).

Vision

Oregon State University aspires to be recognized nationally for excellence in academic advising among land grant institutions.

Mission

Oregon State University academic advising is a teaching and learning process dedicated to student success. Academic advising engages students in developing a plan to realize their educational, career and life goals.

Values

The values associated with OSU advising are closely aligned with the stated values of the university.

Accountability: We are committed to providing timely, accurate, and intentional advising.

Diversity: We honor the unique nature and interests of each student. Advising services and delivery methods will be shaped to fit the diverse needs of our campus populations.

Respect: We seek to establish a reciprocal relationship with students based on an ethic of care and shared responsibility.

Social Responsibility: We foster a culture of independent thinking and global awareness so that students make informed, socially responsible choices consistent with their academic, career and life goals.

Integrity: We seek to engage students in a fair and professional process of meaningful self-reflection and authentic inquiry.

OSU Oregon State University
MyDEGREES

[Back to Self-Service](#)
[FAQ](#)
[Help](#)

Student ID 930326459	Name Test Person REGISTRAR, Eil	Degree BS	Major Business Administration	Level 01	Student Class Level	Last Audit Today
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Degree Checklist
Planner
GPA Calc

Format:
Student View
View
Save as PDF
[Class History](#)
[Alpha History](#)

History

What If

Look Ahead

MyDEGREES PROD

Student View

Student	Test Person REGISTRAR, Eileen	Campus
ID	930326459	Level
Confidential		Degree
Holds		College
Academic Advisors	Laurence, Nancy Lynn McFarlane, Brett L	Major
Class Standing		Option
Academic Standing	Good Standing	Minors
OSU GPA		Graduation Sta
Transfer GPA	0.00	

Goals

OSU academic advising reflects the institutional goal of excellence in teaching and learning that is focused on student success. We will...

- Continually assist students in understanding the nature, purpose and potential of higher education.
- Ensure that students have access to knowledgeable and informed advisors who demonstrate care and respect.
- Mentor students as they explore and clarify their values and educational and life goals.
- Provide accurate information about educational opportunities, requirements, policies and procedures.
- Collaborate with students on the development and implementation of academic plans and educational experiences congruent with their interests and abilities.
- Communicate regularly with students to monitor and evaluate their educational progress.
- Teach students to utilize university resources to maximize their unique educational and personal potential.
- Improve university-wide academic advising via an ongoing assessment program.

Academic Advising

Academic advisors assist you in long- and short-term academic and career planning. They provide information on curricula, educational and experiential options within your college and the university, schedule planning, and help interpret university and departmental requirements.

The following are tips from academic advisors to assist you in getting the most out of your academic advising appointment.

- Know who your academic advisor is.
- Meet with your academic advisor on a regular basis.
- Schedule your academic advising appointment well-ahead of Phase I registration.
- Prepare for your advising appointment.
- Utilize MyDegrees advising tool, your major advising guide, the OSU Baccalaureate Core guide.
- Understand the Academic Regulations.
- Abide by the academic calendar deadlines.
- Take responsibility for learning your degree requirements.
- Understand the advisor/advisee responsibilities.
- Utilize advising technology.

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UNIVERSITY OVERVIEW

Oregon State University provides diverse educational opportunities through the undergraduate and graduate programs of its 11 colleges and one school. Academic choices include studies in scientific, technological, interdisciplinary, and professional as well as liberal arts fields. A land grant, sea grant, space grant, and sun grant university with beginnings in the 1850s, OSU is now home to more than 28,800 undergraduate, graduate, and first professional students, representing about 90 countries, every state in the nation and every county in the state of Oregon.

In addition to its regular educational programs, the university is responsible for Oregon's Land Grant mission of research, education, and outreach. OSU Extension Service delivers educational programs in all of Oregon's 36 counties, reaching out to communities with programs as diverse as Master Gardeners, 4-H, and community leadership. Working in collaboration with Extension Service faculty, the researchers in Oregon's Agricultural Experiment Station conduct scientific, social, and economic research at 11 branch stations at 15 locations across the state, including one of the nation's only urban experiment stations, the Food Innovation Center in Portland.

Oregon State University Ecampus provides learners with access to an OSU education no matter where they live. Ecampus offers accredited courses and degree programs online and at various sites throughout the state of Oregon. There are currently 16 undergraduate degree programs, 19 undergraduate minors and 17 graduate programs being delivered online and at a distance. The Ecampus website is <http://ecampus.oregonstate.edu>.

In addition to these extended campus opportunities, OSU has established a dual enrollment Degree Partnership Program (DPP) with all 17 Oregon community colleges and several others in Hawaii. With the degree partnership-dual enrollment programs, students may take classes at both institutions simultaneously. Students complete just one application, pay one application fee, and have the freedom to select courses from either institution's schedule of classes. The DPP website is <http://oregonstate.edu/partnerships>.

OSU's educational partners include all Oregon community colleges, Eastern Oregon University, Oregon Center for Advanced Technology Education, Oregon Health and Science University, Portland State University, Southern Oregon University, University of Idaho, University of Oregon, and Washington State University.

The OSU-Cascades branch campus in Bend, Oregon—the first branch campus

in the state—began offering undergraduate and graduate degree programs fall term 2001 in partnership with Central Oregon Community College. OSU offers 15 undergraduate degree programs, three graduate degree programs, and 12 different minors. Students enroll, register, and pay tuition fees at OSU-Cascades, but earn a degree awarded by Oregon State University. In 2015, OSU-Cascades will become a full four-year branch campus of OSU and will begin enrolling freshmen and sophomores in a broad range of undergraduate programs. The OSU-Cascades website is www.osucascades.edu.

ACCREDITATION

Oregon State University is accredited by the Northwest Commission on Colleges and Universities. The university is authorized to offer baccalaureate, master's, doctorate, and first professional degrees, as well as undergraduate-, postbaccalaureate-, and graduate-level certificates. The Northwest Commission on Colleges and Universities reaffirmed the accreditation of Oregon State University in Spring 2011. The next comprehensive evaluation is scheduled for 2018. The accreditation includes the College of Pharmacy.

In the **College of Agricultural Sciences**, the Rangeland Sciences program is accredited by the Society for Range Management. The Department of Food Science and Technology's curricula are approved by the Education Committee of the Institute of Food Technologists. The Agricultural Education major is accredited by the National Council for Accreditation of Teacher Education (NCATE) and the Oregon Teacher Standards and Practices Commission (TSPC).

In the **College of Business**, the Business Administration programs (undergraduate and graduate) are accredited by the Association to Advance Collegiate Schools of Business—International.

The **College of Education** programs are accredited by the National Council for Accreditation of Teacher Education (NCATE) and the Oregon Teacher Standards and Practices Commission (TSPC) for the preparation of elementary and secondary teachers. The graduate program in Counseling is accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP).

In the **College of Engineering**, the Bachelor of Science degrees in Bioengineering, Chemical, Civil, Ecological, Electrical and Computer, Environmental, Industrial, Manufacturing, Mechanical, and Nuclear Engineering baccalaureate programs are accredited by the Engineering Accreditation Commission of the ABET, Inc. 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; 410-347-7700. The Construction Engineering

Management program is accredited by the American Council for Construction Education. The Bachelor of Science degree in Computer Science-Computer Systems option is accredited by the Computing Accreditation Commission of the ABET, Inc. 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; 410-347-7700. The Bachelor of Science degree in Radiation Health Physics is accredited by the Applied Science Accreditation Commission of the ABET, Inc. 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; 410-347-7700.

In the College of Forestry, BS degrees in Forest Management, Forest Operations Management, Forest Engineering, and Forest Engineering-Civil Engineering are accredited by the Society of American Foresters (SAF). In addition, the BS degree in Forest Engineering and the BS double degree in Forest Engineering-Civil Engineering are accredited by the Engineering Commission of ABET, www.abet.org. The BS degree in Renewable Materials is accredited by the Society of Wood Science and Technology (SWST).

In the **College of Liberal Arts**, the Music Education MAT degree program is accredited by the National Council for Accreditation of Teacher Education (NCATE) and by the Oregon Teacher Standards and Practices Commission (TSPC).

The **College of Pharmacy's** PharmD program is accredited by the Accreditation Council for Pharmacy Education (ACPE). The college also offers Community Pharmacy Residencies jointly accredited by the American Society of Health Systems Pharmacists and the American Pharmacists Association.

In the **College of Public Health and Human Sciences**, the Athletic Training major is accredited by the Commission on Accreditation of Athletic Training Education. The Dietetic option in the Nutrition major is accredited by the Accreditation Council for Education in Nutrition and Dietetics of the Academy of Nutrition and Dietetics, as is the transcript-visible post-baccalaureate Dietetic Internship. The graduate Physical Education Teacher Education licensure program is accredited by the Council for the Accreditation of Educator Preparation and the Oregon Teacher Standards and Practices Commission. The Health Management and Policy undergraduate program is certified by the Association of University Programs in Health Administration and the Master of Public Health program is accredited by the Council on Education for Public Health. In Human Development and Family Sciences, the Human Services option is accredited by the Council for Standards in Human Services Education, and the OSU Child Development Center in Bates Hall is

accredited with the National Association for the Education of Young Children (NAEYC). HDFS participates in a double degree program in Early Childhood/Elementary Education that is accredited through the College of Education's teacher education programs. The Double Degree pathway includes all the course work and field experiences necessary to qualify for an Oregon Initial Teaching License granted by the Teacher Standards and Practices Commission (TSPC).

In the **College of Science**, the Bachelor of Science in Chemistry Track One is approved by the American Chemical Society and has two options: advanced biochemistry and advanced chemistry.

The **College of Veterinary Medicine's** DVM program is accredited by the American Veterinary Medical Association: Council on Education. In addition to the DVM degree, the Veterinary Diagnostic Laboratory is accredited by the American Association of Veterinary Laboratory Diagnosticians, and the Small Animal Teaching Hospital is accredited by the American Animal Hospital Association.

Student Health Services is accredited by the Accreditation Association for Ambulatory Health Care and is a member of the American College Health Association. The Student Health Services Laboratory is accredited by the Commission on Office Laboratory Accreditation (COLA).

The university's **Counseling and Psychological Services (CAPS)** office is accredited by the International Association of Counseling Services, Inc., and the pre-doctoral training program at CAPS is accredited by the American Psychological Association.

The Oregon State University **Institutional Animal Care and Use Program** is fully accredited by the **Association for Assessment and Accreditation of Laboratory Animal Care, International (AAALAC)**. AAALAC accreditation is recognized world-wide as the gold standard for animal research programs. OSU's participation in the rigorous AAALAC accreditation process demonstrates a campus-wide commitment to humane and responsible animal use in research, instruction and testing and dedication to excellent science. This institutional accreditation encompasses all OSU sites where university-owned animals are housed or maintained, including the College of Agricultural Sciences, the College of Veterinary Medicine, the Eastern Oregon Agricultural Research Centers, the Hatfield Marine Science Center, the Oregon Hatchery Research Center, the Laboratory Animal Resources Center and the entire campus research enterprise.

The Academic English and General English programs at **INTO OSU** are ac-

credited by the Commission on English Language Program Accreditation (CEA) for 5 years from August 2013. **INTO OSU** agrees to uphold the CEA Standards for English Language Programs and Institutions. CEA is recognized by the U.S. Secretary of Education as a national accrediting agency. For further information about this accreditation, please contact the Commission on English Language Program Accreditation, 801 N. Fairfax St., Suite 402A, Alexandria, VA 22314, 703-665-3400, www.cea-accredit.org

For further information, visit <http://oregonstate.edu/admin/aa/apaa/accreditation/nwccu-institutional-accreditation>.

HISTORY OF OSU

Founded in 1858 as a small, private academy called Corvallis College, Oregon State University has developed into a major teaching, research, and public service institution.

College-level courses were introduced into the curriculum about 1865, and two men and one woman fulfilled the requirements for baccalaureate degrees in 1870, becoming the first graduates of a state-assisted college in the western United States.

In its early days, Corvallis College was maintained by the Methodist Episcopal Church, South, and was only partly state-supported. The state assumed complete control in 1885.

With the assumption of state control, the college became known as Oregon Agricultural College. The name was changed to Oregon State College in the 1920s and to Oregon State University on March 6, 1961.

In designating Corvallis College as Oregon's agricultural institution, the state legislature accepted the provisions of the Morrill Act, signed into law by President Abraham Lincoln on July 2, 1862. The act provided grants of land to be used by states for the sole purpose of endowing, supporting, and maintaining publicly controlled colleges.

State assistance to higher education in Oregon started on October 27, 1868, when Corvallis College was designated as "the agricultural college of the state of Oregon."

Following designation of the college as a land grant institution, agriculture was added to the existing arts and science curriculum in 1869. The curriculum continued to expand, with professorships in commerce (1880), agriculture (1883), household economy (1889), and engineering (1889) resulting in the establishment in 1908 of the professional schools of commerce, agriculture, home economics, and engineering. The first summer session was also held in 1908.

Curricular growth continued with the schools of forestry (1913), mines (1913),

pharmacy (1917), education (1918), basic arts and sciences (1922), and health and physical education (1931).

In 1932, the Oregon State Board of Higher Education established the School of Science for the state system at Corvallis, eliminated the School of Mines, and reduced the School of Health and Physical Education to a division. Major work in business administration was discontinued but was reinstated when the College of Business was established (first as a division) in 1943. The College of Liberal Arts was established (as the School of Humanities and Social Sciences) in 1959. The Department of Oceanography was established in 1959, became the School of Oceanography in 1972 and the College of Oceanography in 1983. In 1992 the Department of Atmospheric Sciences in the College of Science was merged with the College of Oceanography and renamed the following year as the College of Oceanic and Atmospheric Sciences. In 2011, the Department of Geosciences in the College of Science was merged with COAS and the college renamed the College of Earth, Ocean, and Atmospheric Sciences. The College of Health and Physical Education (now the College of Public Health and Human Sciences) was reinstated (as a school) in 1974, and the College of Veterinary Medicine was established (as a school) the following year. In 1983, all schools of the university, except the School of Education, were redesignated as colleges. In 1989, the School of Education became a college. In 1991, the College of Education merged with the College of Home Economics, and within the College of Home Economics and Education, was renamed the School of Education. In 1995 the University Honors College was established. In 2002, the College of Health and Human Performance and the College of Home Economics and Education were merged into the College of Health and Human Sciences. As part of this restructuring, the new School of Education became an independent academic unit. In 2005, the School of Education was renamed the College of Education. The College of Health and Human Sciences was renamed the College of Public Health and Human Sciences in 2011.

Following the approval of legislation adopted by the 2013 Oregon Legislature, Oregon State University made the decision to have its own institutional board of trustees. That board was appointed by Oregon Governor John Kitzhaber in the fall of 2013 and will assume all of its official duties on July 1, 2014.

Presidents of the institution since its founding are:

1. William A. Finley, 1865–72;
2. Benjamin L. Arnold, 1872–92;
3. John M. Bloss, 1892–96;

4. Henry B. Miller, 1896–97;
5. Thomas M. Gatch, 1897–1907;
6. William Jasper Kerr, 1907–32;
7. George Wilcox Peavy, 1934–40;
8. Frank Llewellyn Ballard, 1940–41;
9. August Leroy Strand, 1942–61;
10. James Herbert Jensen, 1961–69;
11. Robert William MacVicar, 1970–84;
12. John V. Byrne, 1984–95;
13. Paul G. Risser, 1996–2002;
14. Edward J. Ray, August 2003–present.

Acting presidents of the institution since its founding are:

- Joseph Emery, 1872
- John D. Letcher, 1892
- George Wilcox Peavy, 1932–34
- Francois Archibald Gilfillan, 1941–42
- Roy Alton Young, 1969–70
- Timothy P. White, 2003

For more details, see http://osulibrary.oregonstate.edu/archives/chronology/chron_head.html.

For the Best of OSU Archives, see <http://oregondigital.org/digcol/archives/index.html>.

ORGANIZATION OF THE UNIVERSITY

The **president** is the chief executive officer of the university. He is appointed by the **Oregon State Board of Higher Education**, and is responsible for the overall leadership and direction of the university. The **provost and executive vice president** is the chief academic and operating officer and is responsible for the daily operations of the university.

In November 2009, four new divisions were created as part of OSU's Strategic Alignment and Budget Reduction Implementation Plan: the Division of Arts and Sciences, Division of Business and Engineering, Division of Earth Systems Science, and the Division of Health Sciences.

The academic programs of Oregon State University are divided among 11 colleges, the Graduate School, and the University Honors College, each with a dean responsible for all faculty, staff, students, and academic programs.

The 11 colleges are the College of Agricultural Sciences; College of Business; College of Earth, Ocean, and Atmospheric Sciences; College of Education; College of Engineering; College of Forestry; College of Public Health and Human Sciences; College of Liberal Arts; College of Pharmacy; College of Science; and the College of Veterinary Medicine.

Colleges are divided into departments or schools administered by a department head, chair, or director. Each department may offer several programs of study leading to degrees, certificates, options, or minors requiring a specific group of courses for completion.

Some courses and programs described in the OSU General Catalog are offered

throughout the year online and at a distance by OSU Ecampus. A list of online and distance education courses and programs are available on the Web at <http://ecampus.oregonstate.edu>.

OSU Extended Campus also is home to OSU Summer Session, which serves more than 10,000 students annually on the Corvallis campus, online and at the OSU Hatfield Marine Science Center on the Oregon coast. Summer session courses are published annually in the OSU Summer Session Planning Guide and listed in the online schedule of classes. The OSU Summer Session website is <http://summer.oregonstate.edu>.

This OSU General Catalog lists requirements for each program, as well as all regular courses offered by Oregon State University. A number of special temporary or 'X' courses are also offered each year and are listed in the online Schedule of Classes.

The **Graduate School** section of this catalog offers a summary of graduate programs and general regulations.

Programs and courses offered by OSU-Cascades on the Central Oregon Community College campus in Bend, Oregon, are available on the Web at <http://www.osucascades.edu/>.

CATALOG DEFINITIONS

The following terms are used throughout the catalog.

Academic year: The time period containing the academic terms fall, winter, and spring (currently September through June). When summer term is considered as part of an academic year, or when it is considered as part of the Banner Student Information Systems (SIS), summer term is the first term of the academic year.

Advisor: A faculty member appointed by a program, department, school, or college to advise students during their college experience.

BA degree: The Bachelor of Arts degree is conferred for broad and liberal education in humanities, arts, social sciences, and sciences. College BA requirements provide: a) a breadth of preparation in these fields that is significantly greater than that required of all undergraduates through the baccalaureate core; and b) foreign language proficiency certified by the School of Language, Culture, and Society as equivalent to that attained at the end of the second year course in the language. Proficiency in American Sign Language equivalent to that attained at end of the second year also meets the BA language requirement.

BS degree: The Bachelor of Science degree is conferred for focused curricula that emphasize scientific ways of knowing and quantitative approaches to understanding in the sciences and social

sciences, and for curricula in professional fields.

Baccalaureate core: The university's general education requirements. See Earning a Degree at Oregon State University in this catalog. Courses in the baccalaureate core list have an asterisk in front of the title.

Baccalaureate degree: An approved academic award given for the satisfactory completion of an instructional program requiring at least four but not more than five years of full-time equivalent college-level academic work that includes the following: (1) institutional general education requirements (i.e., baccalaureate core); (2) major area of study requirements; and (3) may include option, minor, supporting area, or elective requirements. A minimum of 180 credits is required for most degree programs. Some majors may require more. The conditions and conferral of the award are governed by the faculty and ratified by the Oregon State Board of Higher Education.

Blanket-numbered courses: Reserved number courses such as 401/501/601. See Reserved numbered courses.

Certificate program (undergraduate): A specified interdisciplinary program of study leading to an official certificate and notation on the transcript. A certificate program draws courses from more than one department, rather than a single department (as with most minors). An undergraduate certificate program must be taken in conjunction with a formal degree program. An undergraduate certificate requires a minimum of 27 credits.

Certificate program (postbaccalaureate): A specified program of study of undergraduate courses leading to an official certificate and notation on the transcript. A completed baccalaureate degree program from an accredited institution is required. A postbaccalaureate certificate program requires a minimum of 27 credits.

Certificate program (graduate): A structured progression of graduate-level courses that constitute a coherent body of study with a specifically defined focus within a single discipline or a logical combination of disciplines. It is designed for students who have completed a baccalaureate degree and are in pursuit of advanced-level learning. A graduate certificate requires a minimum of 18 graduate credits.

Certificate program (professional): A site-based training and professional development certificate that is not transcript visible.

Course: An organized unit of instruction or research. Types include lectures, recitations, seminars, laboratories, discussions, internships, clerkships, reading

and conference, independent study, and other categories of courses.

CRED (Credentialed): A student who has received a previous baccalaureate degree from either OSU or another accredited university or college may be granted a subsequent minor, certificate, major or option under the guidelines of Academic Regulation 27. It indicates the student is not seeking a degree, but rather a credential to accompany an existing degree.

Credit: Credits vary, depending upon the type of course and level at which it is offered. One credit is generally given for three hours per week of work in and out of class. For example, each hour of class lecture is generally expected to require two hours of work out of class. One credit would be given for a lecture course that met for one 50-minute period each week over a 10-week period; i.e., 10 contact hours between faculty and students. One credit is typically given for a laboratory course that meets for two to three hours per week for an entire term. Equivalent credits are given for recitations, discussions, and other types of courses. **All credits given in the General Catalog refer to quarter credits.** When transferring in course work from a semester system institution, multiply the number of credits by 1.5 to determine how many quarter credits will be transferred ($3 \text{ semester hours} \times 1.5 = 4.5 \text{ quarter credits}$). If planning to transfer OSU credits out to a semester system institution, multiply the number of quarter credits by .67 to determine how many credits will transfer ($4 \text{ quarter credits} \times .67 = 2.68 \text{ semester credits}$).

Curriculum: (plural *curricula*) An organized program of study and courses required for a specific degree or certificate program.

Degree: An academic award granted upon satisfactory completion of a set of collegiate-level educational requirements.

Discipline: A field of study in which a student may concentrate, such as sociology, anthropology, or mathematics.

Doctoral degree: An approved academic award given as a sign of proficiency in scholarship and for the satisfactory completion of an instructional program requiring at least three years of full-time equivalent academic work beyond the baccalaureate degree, the completion of which signifies recognized competence, original research and/or the capacity to do independent advanced graduate-level analysis. A minimum of 108 credits is required beyond the baccalaureate degree. [**Note:** The total number, above the minimum, will vary by degree program.] The conditions and conferral of the award are governed by the faculty and ratified by the Oregon State Board of Higher Education.

Electives: Courses that students may select, either for general knowledge or for fulfilling specific degree requirements.

Endorsement: An endorsement is the subject matter (content area) or specialty in which an individual is licensed to teach. Endorsements can be part of an initial teaching license or can be added later.

First professional degree: An academic award granted for an instructional program the completion of which: (1) signifies completion of the academic requirements to begin practice in the profession; (2) requires at least two years of full-time equivalent college-level work prior to entrance; and (3) usually requires a total of at least five years of full-time equivalent academic work to complete the degree program, including prior required college-level work plus the length of the professional program itself (examples, DVM in veterinary medicine and PharmD in pharmacy). The conditions and conferral of the award are governed by the faculty and ratified by the Oregon State Board of Higher Education.

Grade-point average (GPA): The total number of grade points received for grades divided by the total number of credits attempted. OSU uses a 4-point grade scale.

Graduate area of concentration: A graduate area of concentration is a subdivision of a major or minor in which a strong graduate program is available. Areas of concentration may be referenced on the student's program of study, but they are not listed on the student's transcript. "Areas of concentration" can only be used in association with graduate programs.

Graduate major: A graduate major is the area of academic specialization, approved by the State Board of Higher Education, in which the student chooses to qualify for a graduate degree. Upon completion of a graduate degree, the degree awarded and the graduate major are listed on the student's transcript.

Graduate option: Options are for students of a specific major. An option is one of several distinct variants of course aggregations within a major that focus on an area of study designed to provide a student with specialized knowledge, competence, and skills while sharing a minimum core of courses.

A graduate option consists of a minimum of 12 designated quarter credits of related course work (excluding thesis credits), comprised of course work offered by the sponsoring unit as well as by other academic units. The option may be comprised of specific courses, completion of a designated number of credits from a longer list of alternative courses, or a combination of specific and alternative course lists. Approved options may be

added to a graduate program of study, and approved by the faculty advisor(s) and the director of the sponsoring unit. On the program of study, there should be no overlap in course credits between options (the same course cannot be used to satisfy credit requirements in multiple options). When the unit submits the final examination card to validate awarding of the major to the Graduate School, the unit will also validate that the requirements of the option have been completed.

Hybrid Course: A hybrid course includes both regularly scheduled on-site classroom meetings, and significant online out-of-classroom components, that replace regularly scheduled class meeting time.

Interdisciplinary: A course or program that integrates concepts, knowledge, or faculty from several fields of study.

Lower-division courses: Course offerings at a level of preparation usually associated with freshmen and sophomore students (e.g., 100- and 200-level courses).

Major (graduate): See Graduate major above.

Major (undergraduate): An extensive program of study in a designated subject area. Majors require at least 36 credits, 24 of which must be upper-division.

Master's degree: An approved academic award given as a mark of proficiency in scholarship and for the satisfactory completion of an instructional program requiring at least one but not more than two years of full-time equivalent academic work beyond the baccalaureate degree. A minimum of 45 credits is required beyond the baccalaureate degree. [**Note:** The total number, above the minimum, will vary by degree program.] The conditions and conferral of the award are governed by the faculty and ratified by the Oregon State Board of Higher Education.

Minor (graduate): A graduate academic area that clearly supports the major and consists of a group of related courses totaling at least 15 credits in a specific topical area.

Minor (undergraduate): A secondary field of specialized study that may be offered by an academic unit for its own majors and/or majors from other academic units. Minors require at least 27 credits, 12 of which must be at the upper-division level. An approved minor is placed on the student's transcript.

Option (undergraduate): Options are for students of a specific major. Options consist of at least 21 designated credits of course work, 15 of which must be at the upper-division level. If all requirements have been met, the option

may be listed on a student's transcript.

Perspectives courses: Baccalaureate core courses that integrate fundamental knowledge from science and liberal arts disciplines to develop cultural, historic, and scientific perspectives.

Reading and conference: A course focused on reading assignments to be completed in conferences with the instructor.

Reserved numbered courses: Certain blocks of numbers that have been assigned for specific courses that may be taken for more than one term. The credits being granted vary according to the amount of work done.

100–110 and 200–210: Survey or foundation courses in the liberal arts and sciences

401/501/601: Research and Scholarship

402/502/602: Independent Study

403/503/603: Thesis/Dissertation

404/504/604: Writing and Conference

405/505/605: Reading and Conference

406/506/606: Special Problems/Special Projects

407/507/607: Seminar

408/508/608: Workshop

409/509/609: Practicum/Clinical Experience

410/510/610: Internship/Work Experience

Sequence: Two, three, or four closely related courses that are usually taken in numerical order and through more than one term.

Skills courses: Baccalaureate core courses designed to give the student fundamental mathematical, communication, and fitness competence.

Special topics courses (X99): Like reserved numbered courses, special topics courses may be repeated as specified by the academic unit responsible for the course offering. It is implied that the course content is different each time the student takes the course.

Student Enrollment Levels: The levels below establish enrollment levels for federal financial aid eligibility and the deferment of student loans. Summer enrollment levels are the same as other terms.

Full Time: 12 or more credits in a term

Three Quarter Time: 9 to 11 credits in a term

Half Time: 6 to 8 credits in a term

Syllabus: A list of course objectives, lecture topics, assigned reading, exams, etc., prepared and distributed by a professor at the beginning of the term.

Synthesis courses: Baccalaureate core upper-division courses that emphasize interdisciplinary, critical thinking approaches to global, technological, and societal issues.

Term: Usually one-third of the school year. Terms at OSU are divided into fall, winter, and spring terms (also referred to as "quarters"). Summer term is generally an 8- or 11-week session during the summer. See "Credits" above.

Upper-division courses: Course offerings at a level of preparation usually associated with junior or senior students (e.g., 300- and 400-level courses).

Waive: This term refers to decisions of advisors to "waive" a course or courses in a student's program. Typical reasons include transfer credit for equivalent courses, equivalent experience in the profession or discipline, and petitioning for and successfully completing an examination. Waiving courses usually does not decrease the total credits required for completion of the degree or program; students should discuss this with their advisor.

Workshop: A brief intensive course for a small group which emphasizes problem solving.

Writing Intensive Courses (WIC): Designated upper-division courses in the major discipline that use student writing as a significant approach to learning. WIC courses must meet a variety of requirements, as do other courses in the baccalaureate core. WIC courses have a carat, ^, in front of the title.

READING A COURSE DESCRIPTION

The elements of a typical course description found under department/school headings in the colleges are illustrated by the microbiology course example below:

Science Course Example:
MB 479. FERMENTATION MICROBIOLOGY (3). An introduction to industrial microbiology with a focus on the physiology of fermentation and use of microorganisms for the production of food ingredients, fermented foods, and beverages. **CROSSLISTED** as FST 479/FST 579. **REQ:** Field trips. **PREREQS:** BB 450 and MB 302*, (BB 350 or BI 314). This course is repeatable for a maximum of 6 credits.

Course Designator (Subject Code): **(MB)** an abbreviation representing the department, college, or program offering the course. MB indicates that the course is offered through the Department of Microbiology.

Number: (479) indicates the level of the course. This is an upper-division, undergraduate course. 400-level courses are offered for undergraduate credit. Courses numbered at the 500- or 600-level may be taken for **graduate credit**. Courses numbered 500–599 are generally taken by master's candidates and courses numbered 600–699 are taken by doctoral candidates. (See Course Numbering System below.)

Title: FERMENTATION MICROBIOLOGY

Credit: (3) the number of credits awarded for successful completion of the course.

Course description: A brief description of what will be taught in the course. "An introduction to industrial microbiology..."

CROSSLISTED: **CROSSLISTED** as FST 479/FST 579 means the same course is also offered through another department; course numbers, titles, credits, descriptions, and prerequisites are the same for both courses. Only the course designator (subject code) is different.

REQ: A requirement for that course, such as field trips.

PREREQS: Prerequisites a student must have completed or be currently enrolled in before registering for the course. The registration system and/or instructor may not allow students to enroll for the course unless they have the prerequisite on their transcripts or are currently enrolled in the prerequisite. Students may be administratively dropped after registering for their courses if they have not met the prerequisites of a course. These courses are the background necessary for successful performance in the course.

*** (Asterisk):** The asterisk *after* a prerequisite (MB 302*) indicates that it *may* be taken concurrently with the course described.

COREQ: A course that *must* be taken simultaneously with the course described.

REC: Means the course is recommended but not required by the instructor.

This course is repeatable...: Some courses may be taken again for additional credit that applies toward the student's academic program.

Liberal Arts Course Example:
HST 202H. HISTORY OF THE UNITED STATES (4). Provides an overview of the development of the U.S. from the pre-Columbian era to the present. Attention is given to economic, political, and social trends, as well as to international relations. Covers 1820 to 1920. HST 201H, HST 202H, and HST 203H need not be taken in sequence. (H) (SS) (Bacc Core Course) **PREREQS:** Honors College approval required.

Letter suffix: (HST 202H) "H" signifies an Honors College course. An "X" signifies an experimental course.

Liberal Arts Core: Students pursuing College of Liberal Arts majors are required to complete courses in certain study areas. Four abbreviations are used in the college to indicate courses that may be used to fulfill requirements in each of these areas:

- **(FA)** Fine Arts Core
- **(H)** Humanities Core

- **(NC) Non-Western Core**
- **(SS) Social Studies Core**

Additional Curricular Terms:

See the Academic Programs website at <http://oregonstate.edu/admin/aa/apaa/academic-programs/curriculum/curricular-policies-and-procedures>.

COURSE NUMBERING SYSTEM

Oregon State University follows the basic course numbering system used by institutions in the Oregon University System (OUS):

0–99. Noncredit or credit courses of a remedial, terminal, or semiprofessional nature that are not applicable toward degree requirements.

100–299. Undergraduate, lower-division courses.

300–499. Undergraduate, upper-division courses.

500–599. Graduate courses offered primarily in support of a master's degree but which are also available for doctoral-level credit. Undergraduates of superior scholastic achievement may be admitted on approval of the instructor and department head. An undergraduate student may apply to reserve these courses for later use on a graduate degree program.

600–699. Graduate courses offered principally in support of doctoral-level instructional programs but also available for master's program credit.

700–799. Professional or technical courses that may be applied toward a professional degree (such as DVM or PharmD) but not toward other graduate degrees (such as PhD).

800–899. In-service courses aimed at practicing professionals in the discipline. These courses may not be applied to graduate or professional degree programs.

001NC–099NC. Non-credit courses offered through the INTO Oregon State University Intensive English program.

Commonly Numbered Courses.

House Bill 2913 directed the Oregon University System and Oregon community colleges to jointly develop, to the extent

possible, a common course numbering system for lower-division transfer courses. The “Commonly Numbered Course List” represents a good faith effort to meet the requirements of the legislation. The list of courses is recommended for use by campuses’ faculty and administration as they develop or revise academic programs to better facilitate students transferring from community colleges to public four-year institutions. OSU agreed to this list after review by all affected departments. The “Commonly Numbered Course List” includes course descriptions in addition to the course numbers and titles. Course numbers and title should follow the usage in the list. Descriptions may vary. The list is at: <http://oregonstate.edu/admin/aa/apaa/academic-programs/curriculum/curricular-policies-and-procedures#76>.

EQUIVALENT COURSES LIST

Some courses at OSU have equivalent versions with different subject prefixes or course numbers. Such courses are equivalent for degree clearance purposes, in other words, taking either version will meet the requirements for an academic program. Students may only take one of the versions for credit, not both.

Students will not earn credit for a course if they have previously taken its equivalent. Doing so is the same as repeating a course, see Academic Regulation 20, Repeated Courses.

Examples of equivalent courses include:

- Regular and Honors College versions of the same course.
- Crosslisted courses with the same title, course description, and course number (e.g. CS 372 and ECE 372).
- Transfer courses treated as equivalent to OSU courses.
- Courses that have been replaced by a new subject code (e.g. BA 434 replaced by FIN 434).

Equivalent Courses List is in the Registrar's Office Website at <http://oregonstate.edu/registrar/equivalent-courses>

Oregon State University welcomes all students without regard to race, creed, sex, marital status, sexual preference, age, religion, handicap, or national origin who provide evidence of suitable preparation for course work at the university level.

Information for undergraduate, postbaccalaureate, nondegree undergraduate students are available from the Office of Admissions. Admission applications are available at <http://oregonstate.edu/admissions/index.php>.

World Wide Web: <http://oregonstate.edu/admissions/index.php>

On-campus:

B104 Kerr Administration Bldg.

Telephone: 541-737-4411

Toll free: 800-291-4192

Fax: 541-737-2482

OSU code for SAT, AP, TOEFL, or CLEP reports: **4586**

OSU code for ACT reports: **3482**

ADMISSION REQUIREMENTS FOR FIRST-YEAR STUDENTS

When to Apply

See application deadlines at <http://oregonstate.edu/admissions/admission-priority-deadlines-students-0>.

The application and fee must be submitted electronically by the respective deadline.

The Admission Process

Apply online at <http://oregonstate.edu/admissions/>. Applicants are required to use a valid Visa, MasterCard, or Discover credit card to pay the \$60 nonrefundable application fee. Request that your high school send your *official* high school transcript to OSU, and have your *official* SAT or ACT test scores sent to OSU.

Telefax (Fax) credentials are considered official if faxed **directly** from a high school within the U.S.A. with a cover page. The fax number is 541-737-2482.

Portfolios, videotapes, essays and personal interviews are generally not required.

EVALUATION PROCESS

Admission to Oregon State University is selective and competitive.

Complete applications are first reviewed to confirm successful completion of the 15 high school subject requirements and GPA earned. For those who meet GPA and subject requirements, there is no minimum SAT or ACT score requirement. However, official scores from one of these tests are required for admission and advising purposes.

Applicants for undergraduate admission are required to complete an "Insight Résumé," a written assessment designed to evaluate students' noncognitive attributes. These attributes include self-concept, realistic self-appraisal, handling the system, ability to set long-range goals, leadership, connections with a strong support person, community engagement, and nontraditional learning.

Academic performance is not the sole criterion for admission to the university.

The university may evaluate a person's behavior and background to determine their ability to maintain the standards of academic and professional conduct expected at the university. An evaluation may take into consideration current behavior and performance as well as past experiences and actions. Simply qualifying for admission does not guarantee admission.

Go to <http://oregonstate.edu/admissions/main/admission-requirements-1> to see when applicants will be notified of their admission status.

SELECTION OF FIRST-YEAR STUDENTS

OSU's admission requirements promote student success by assessing preparedness and academic potential in the unique context of each student's personal experience. Admission assessment will consider all achievement, both academic and non-academic, to enroll students with a broad range of characteristics and perspectives. These include, but are not limited to: academic achievement, creativity, initiative, motivation, leadership, persistence, service to others, intellectual curiosity, exceptional personal or academic recognition, unusual talent or ability, substantial experience with other cultures, and ability to overcome significant challenges.

The admissions process provides a fair and comprehensive review of all applicants to determine potential success at OSU. It is crucial that applicants carefully complete the application process by providing thorough information. Estimating the likelihood of admission is very difficult without considering the complete application file.

Regular Admission

Initial admission selections are based on a holistic assessment of the criteria listed below. Minimum requirements for admission include a high school grade-point average of 3.0 (on a 4.0 scale) and completion of 15 high school courses with earned grades of C- or higher (See high school course requirements.). Meeting minimum requirements does not guarantee admission.

Strength of Curriculum:

- Quality, quantity, and level of course work throughout the entire high school program, especially course work completed beyond the minimum courses required (See the high school course requirements chart.)
- Advanced placement (AP), international baccalaureate (IB), or college course work completed or in progress
- Strength of the program taken within the context of the high school attended
- Progressively challenging math sequence (beyond Algebra II), demonstrated by performance

Office of Admissions
B104 Kerr Administration Bldg.
Oregon State University
Corvallis, OR 97331
541-737-4411
Email: osuadmit@oregonstate.edu
Website: <http://oregonstate.edu/admissions/index.php>

ADMINISTRATION

Noah Buckley,
Director,
 541-737-0583

Matt Ogawa,
Associate Director,
 541-737-9807

Mickey Reynolds,
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 541-737-2499

Blake Vawter,
Associate Director,
 541-737-3597

Erin Rau,
Assistant Director-Residency Officer,
 541-737-0579

Amanda Hutchinson,
Campus Visitor Center Program Coordinator,
 541-737-8863

Academic Performance:

- A minimum high school grade-point average of 3.0 (on a 4.0 scale as calculated by the Office of Admissions)
- Class rank taken in context with academic rigor and size of high school attended
- Performance on standardized tests: SAT or ACT.

Insight Résumé:

- Understanding of you as a unique, contributing individual
- Your accomplishments, perspectives, experiences, and talents
- Your achievements within the context of your social and personal circumstances
- Participation in activities that develop academic, intellectual, and leadership abilities

Insight Résumé scores are also used for scholarship selection, secondary review of applicants who do not meet admission requirements, and compiling baseline data.

Extended Admission

Students not selected for regular admission may be invited to participate in the extended admission process. Extended admission decisions will be determined by the Undergraduate Admissions Committee. In addition to regular admission requirements, students participating in the extended admission review will be asked to provide additional materials for consideration. Please refer to the OSU Admissions website for specifics: <http://oregonstate.edu/admissions/extended-admission-0>.

HIGH SCHOOL COURSE REQUIREMENTS

College Preparatory Subjects	Minimum Units
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Grades of C- or higher are required.

English..... 4 years
Mathematics 3 years
Culminating at the Algebra II level or higher
Social Studies..... 3 years
Science 3 years

One year each of two different sciences (biology, chemistry, physics, etc.).

One year of lab strongly recommended.

Foreign Language..... 2 years
(not required if high school graduation of GED date prior to 1997)

May be met in any one of these ways:

- Completing two years of the same high school-level foreign language
- Earning grade of C- or higher in the third year of high school-level foreign language
- Completing two consecutive quarters of the same college-level foreign language
- Earning a satisfactory score on an

- approved assessment of foreign language knowledge
- Demonstrated proficiency in American Sign Language (ASL)
- Completing grades 1 through 7 at a school in which all courses are taught in a language other than English (Documentation is required.)

ALTERNATIVES TO SUBJECT REQUIREMENTS

Students unable to fulfill the subject requirements will be eligible for admission by:

1. Earning a 940 total score on two SAT Subject Tests (Math level I or II and a second test of choice [foreign language recommended])
- OR**
2. Successfully completing course work (high school or college transfer) for specific subject deficiencies.

Alternatives should be completed by high school graduation.

Test Requirements

Freshman applicants (except those applying on the basis of GED scores) must submit Scholastic Assessment Test (SAT-Reasoning) or American College Test (ACT) scores. Test scores are used to determine course placement and are considered for applicants not meeting the minimum high school GPA requirement.

Official scores are required.

The institutional code for having most test scores sent to OSU is **4586**.

The OSU ACT code is **3482**.

High School Graduation

Public high school students must graduate from standard high schools.¹ Private high school students must graduate from accredited high schools.²

Footnotes

¹ Standard high schools are public high schools that are certified as meeting specified levels of resources, services, and quality established by the Oregon Department of Education.

² Accredited high schools are those that are reviewed and recognized by a regional entity, such as the Northwest Association of Schools and Colleges, as meeting an appropriate level of academic rigor and support.

Graduates of Nonstandard or Unaccredited High Schools or Home-Schooled Students

Graduates of nonstandard or unaccredited high schools must qualify for admission by meeting institutional SAT Reasoning Exam/ACT requirements (see minimums below) **and** have an average score of 470 or above (940 total) on two College Board SAT subject tests.

(Math level I or II and another test of the student's choice. An examination in a second language is strongly recommended to qualify a student for admission by meeting the language proficiency requirements. Students who do not take

a SAT subject test in a second language must prove language proficiency through another approved process.)

Meeting minimum requirements does not guarantee admission.

Minimum ACT/SAT Reasoning Requirements for Students Who Did Not Graduate from an Accredited or Standard School (includes Math, Critical Reading, and Writing beginning March 2005)

ACT* 23 or SAT Reasoning 1540

* ACT scores are subject to change with additional information from ACT regarding integration of the optional writing exam.

Applicants must submit scores on the SAT Reasoning or American College Test (ACT) that include a standardized writing examination. SAT subject tests are required for applicants who are graduates of unaccredited high schools, including home schooled students. Meeting minimum requirements does not guarantee admission.

Test scores are used:

- as an alternate means of meeting the GPA and/or subject requirements;
- to comply with the admission policy for graduates of unaccredited high schools;
- in selectively admitting qualified applicants; and
- for advising, guidance, and research purposes.

OR

Admission Based Upon GED Scores

Achieve an average GED score of at least 58 (if taken prior to January 2002) or 580 (if taken January 2002 or later). No subtest score can be less than 41 (if taken prior to January 2002) or 410 (if taken January 2002 or later). Applicants admitted on the basis of GED scores *are not required to submit SAT or ACT scores*. Meeting minimum requirements does not guarantee admission.

Please note: Students who graduate from high school or took the GED test in the 1996-97 school year and later must pass two years of the same foreign language prior to admission. Foreign language taken at an unaccredited high school does not qualify. If you have questions pertaining to these guidelines, please contact the OSU Admissions Office regarding your options for completion of this requirement.

PETITION FOR ADMISSION CONSIDERATION

Most students not approved for admission may complete extended admission requirements and will be provided with information about the petition procedure. Deadlines are in effect each term for appeals. For additional information, please refer to the OSU Admissions web-

site: <http://oregonstate.edu/admissions/extended-admission-0>.

ADVANCED PLACEMENT (AP) CREDIT

Oregon State University awards ungraded credit for achievement on certain College Board Advanced Placement (AP) examinations. Information pertaining to specific AP credit policies is available in high school counseling centers or may be obtained from the OSU Office of Admissions website. OSU's college code is 4586 for those wishing to have their scores sent.

INTERNATIONAL BACCALAUREATE CREDIT

Oregon State recognizes IB achievement by awarding credit to students who score 5 or above on standard and higher level IB exams. OSU also grants additional benefits for students who complete the full IB diploma with a score of 30 or higher, as follows:

Sophomore Standing, and **IB Scholarships** are available. Students with a total score on IB exams of 30 or higher may choose to accept the annual, renewable scholarship award of at least \$3,000 **OR** may compete for more substantial awards.

Students must indicate that they would like official test scores sent to OSU. The official International Baccalaureate Certificate is required in order to award credit.

Contact your IB coordinator or IB North America to request score reports. IBO North America
212-696-4464

<http://www.ibo.org/> | Order IBO Transcript Direct Link (<http://www.ibo.org/graduates/transcripts/index.cfm>)

TRANSFER ADMISSION

When to Apply

Apply online at <http://oregonstate.edu/admissions/>. Applicants are required to use a valid Visa, MasterCard, or Discover credit card to pay the \$60 nonrefundable application fee. Request that your high school send your **official** high school transcript to OSU, and have your **official** SAT or ACT test scores sent to OSU. **Official** transcripts must be sent to OSU from each college or university attended.

Please refer to <http://oregonstate.edu/admissions/admission-priority-deadlines-students-0> for application deadlines.

MINIMUM REQUIREMENTS FOR ADMISSION CONSIDERATION

U.S. Citizens and Permanent Residents:

1. Successful completion of no less than 36 quarter (24 semester) graded, transferable credits from

(an) accredited U.S. institution(s). Students with at least 12 quarter hours but fewer than 36 graded transferable hours will be considered on the basis of their high school records and test scores, **and** must have a 2.25 GPA on all collegiate work attempted.

2. Only college-level, transferable credits are counted in those accepted in the GPA computation (professional-technical course grades are not included).
3. Grade of C– or better earned in the following courses:
 - College-level writing equivalent to WR 121 (English Composition) or equivalent.
 - Mathematics course with course content of College Algebra for which the prerequisite is Intermediate Algebra.
 - Two terms of the same foreign language in college will be required of those high school graduates of the class of 1997 and beyond who did not successfully complete two units (years) of foreign language while in high school. For additional information on how to meet foreign language deficiencies, http://www.ous.edu/sites/default/files/stucoun/counres/files/2010Secondlanguagepolicy_final.pdf
4. Eligibility to return to the most recent college or university attended.
5. Academic performance is not the sole criterion for admission to the university. The university may evaluate a person's behavior and background to determine their ability to maintain the standards of academic and professional conduct expected at the university. An evaluation may take into consideration current behavior and performance as well as past experiences and actions. Simply qualifying for admission does not guarantee admission.

Consideration will be given to applicants with a 2.00 GPA and an Associate of Arts Oregon Transfer (AAOT) degree from an Oregon community college.

Evaluation and Transferability of Credit

Only **official** records are used to evaluate eligibility for admission and transferability of credit.

Official transcripts of **all** college work attempted must be submitted directly from the Registrar's Office of each institution. Telefax (Fax) credentials are considered official if faxed **directly** from a U.S. school with a cover page. OSU's fax number is 541-737-2482.

OSU accepts in transfer college-level

courses successfully completed at colleges or universities accredited by an appropriate accreditation agency. An advanced standing report acknowledging the courses accepted by the university will be sent via email by the Office of Admissions after the official letter of admission.

Persons transferring to OSU from a community college may have up to 124 quarter credits (83 semester units) accepted toward their bachelor's degree. If the school previously attended used the semester system, one semester credit equals 1.5 quarter credits at OSU.

CLEP

Applicants who want credit for College-Level Examination Program (CLEP) tests should have official test scores sent to Admissions using **college code 4586**. Additional details are available in the OSU Credit Opportunities brochure and on the OSU Admissions website.

For information on OSU's acceptance of professional-technical courses, please see Academic Regulation 2, paragraph b below.

Acceptance of Credit from a Two-Year Institution

(OSU Academic Regulation 2):

Credit From A Two-Year Institution (Undergraduate Students)

- a. **College Transfer Credits:** Oregon State University accepts for credit toward a baccalaureate degree all college transfer work completed at an Oregon or other accredited community college up to 124 lower-division quarter credits. For Institutional Requirements for Baccalaureate Degrees, see AR 25. Students are encouraged to work with the relevant academic unit to ensure that transfer credits meet department and college requirements for the degree. It would be unlikely for an individual student to be able to use all 124 credits toward an OSU baccalaureate degree. Transfer credits and grades are not used in calculating the OSU cumulative GPA. Students who hold OSU-approved direct transfer degrees from Oregon or other accredited community colleges (e.g., the Associate of Arts Oregon Transfer) or who have 90 or more credits accepted in transfer will be granted junior standing.¹ Students who hold OSU-approved direct transfer degrees will be considered to have met the Perspectives and Skills (except WIC) areas of the Baccalaureate Core. In addition, they must complete the upper-division Synthesis areas of the core. Students transferring from Oregon or other accredited community colleges who do not hold approved direct transfer degrees ordinarily will be given baccalaureate

core credit in the Perspectives and Skills area on a course-by-course basis for work that is judged to be equivalent in content.

- b. **Transfer of Professional-Technical Credits:** a maximum of 12 quarter credits (8 semester credits) of professional-technical course work applicable in an associate's degree or certificate program at an accredited institution can be accepted upon admission to OSU as general elective credit (graded as Pass) and as part of the 124-quarter credit total that can be applied toward a baccalaureate degree.

- c. **Transfer of Professional-Technical Course Credits through Articulation Agreements:** Lower-division OSU credit may be awarded for specific professional-technical community college courses when those courses are validated by articulation agreement with the appropriate OSU department. This may be above the 12 quarter credits of general electives (graded as Pass) allowed when a student is admitted to OSU. Credit will be awarded only upon the recommendation of the appropriate department and college, and approval by the Curriculum Council. Community college professional-technical course work is not equated to upper-division OSU course work. These course credits will count as part of the 124 quarter credits defined in paragraph 2a above. OSU departments who have articulation agreements with community colleges regarding community college professional-technical courses shall review the agreements annually and forward a dated list of the articulated community college courses to the Curriculum Council.

Footnote:

¹ Junior standing does not necessarily imply that OSU institutional, college, division, and/or departmental requirements, which are normally satisfied by OSU students prior to their junior year, have been satisfied.

Petition for Admission Consideration

Transfer students not approved for admission may complete the extended admission requirements and will be provided with information about the petition procedure. Deadlines are in effect each term for appeals.

NONDEGREE STATUS

Nondegree enrollment status is designed for students who want to take courses but do not want to pursue a degree. In some instances nondegree students may not meet regular admission require-

ments. Nondegree students are part-time students who are expected to enroll in no more than 8 credits a term. Students who want to enroll for more than 8 credits a term must apply for regular admission.

Nondegree enrollment status requires no formal admission process and has no requirements for entrance. Nondegree applications should be submitted electronically. Approval is granted for a specific term. Students who are unable to attend the specific term and want to enroll later should contact the Office of Admissions (undergraduate nondegree) or the Graduate School (graduate nondegree).

Nondegree students are given grades and academic records, and are reviewed according to university standards of good academic progress.

Nondegree students who wish to seek full admission and pursue a degree must do so by submitting an undergraduate, postbaccalaureate or graduate application for admission. In all cases, an admission application fee is required. Successful enrollment as a nondegree student does not guarantee regular admission. Credits earned while enrolled under nondegree undergraduate status will be applied to a student's record.

Nondegree graduate students who decide to seek admission to a specific degree program during the course of their studies should note that any credits taken as a nondegree student may or may not be applicable for that degree, depending upon a variety of factors, their chosen program, and the policies of the Graduate School. Graduate students are further advised that academic residency must be completed after full admission as a degree-seeking graduate student, regardless of the number of credits previously earned while in nondegree status. Please refer to "Reclassification of Postbaccalaureate Students, Nondegree-Seeking Students, and Graduate Certificate Students" at <http://catalog.oregonstate.edu/ChapterDetail.aspx?key=36#Section1792>.

Nondegree students follow the registration procedures and policies as outlined in the Registration Information Handbook. The Schedule of Classes is available through the Web at <http://catalog.oregonstate.edu/Default.aspx?section=ClassListing>. Registering students are expected to obtain a student identification card through the ID Center in the Kerr Administration Building.

Tuition and fees for nondegree students enrolled in **fewer than 9** credits are assessed at resident rates based on undergraduate- or graduate-course level. Payment of the health service fee is optional. Enrollment in excess of 8 credits requires that tuition and fees be assessed at the same rates as regular students

and requires full admission as a regular student.

Registration holds in place prior to applying for nondegree status must be satisfied before registration as nondegree student will be allowed.

Academic Regulation 1. Admission for Nondegree Students

- a. Nondegree enrollment status for undergraduate students is designed for students who wish to take 8 or fewer credits per term, but do not wish to pursue a degree or a specific postbaccalaureate credential.
- b. Nondegree enrollment status for graduate students is designed for students who wish to take graduate courses, but do not wish to pursue an advanced degree. Nondegree graduate students are not limited as to the number of courses (credits) per term.
- c. Credits earned as a nondegree undergraduate student may be used to satisfy degree requirements upon admission as a degree-seeking student.
 1. Credits earned while enrolled as a nondegree graduate student will not necessarily apply to a graduate program upon admission to degree-seeking status. Communication with the Graduate School and specific academic programs is advised.
 2. Nondegree students seeking admission to a degree program must do so by submitting an undergraduate, postbaccalaureate, or graduate application for admission.

INTERNATIONAL UNDERGRADUATES AS NONDEGREE STUDENTS

International students who are currently in the U.S. on visas such as an F-1, F-2, B-2, J-1, etc. should consult with OSU's International Student Advising and Services (ISAS) (email: isas.advisor@oregonstate.edu) before submitting the OSU non-degree application for admission. Only certain visa types allow an individual to pursue part-time or non-degree-seeking course work and still maintain one's visa status.

International students who plan to enroll with OSU as non-degree exchange students should use the application form that is made available at each partner institution. For a list of exchange partner institutions, go to <http://oregonstate.edu/international/atosu/students/prospective/exchange>

Undergraduate students who wish to enroll with OSU for one or more terms, but who do not plan to complete degree requirements at OSU and will not partici-

pate in an established exchange program, should contact International Admissions at intladmit@oregonstate.edu for further information, and before applying.

International students who wish to enroll in Academic English, Undergraduate Pathway or Graduate Pathway programs should contact INTO Oregon State University at intladmit@oregonstate.edu for further information.

SELECT A MAJOR

Undergraduates and postbaccalaureate applicants are asked to select a college and a major within that college. The University Exploratory Studies Program is a choice available to undergraduates who are undecided about a major. Students may change their major in consultation with an academic advisor.

ADMISSION OF POSTBACCALAUREATE STUDENTS

Students who want to earn a subsequent undergraduate degree or are fulfilling prerequisites for a degree program from OSU may apply for postbaccalaureate admission through the Office of Admissions. Applicants for consideration must meet the same application deadline and GPA requirements as transfer applicants. The GPA is computed on the first baccalaureate degree plus any subsequent credit earned. Applicants must include a statement of objectives of 150 to 200 words with their application. A \$60.00 application fee must be included with application. Academic departments may impose additional requirements.

ADMISSION OF SUBSEQUENT MINOR, CREDENTIAL OR CERTIFICATE

Students who want to earn a subsequent minor, credential or certificate from OSU may apply for nondegree credential enrollment status. Students must complete the current requirements for a minor, credential or certificate and receive the dean's approval. Students must also achieve a minimum GPA of 2.0 and complete a minimum of 15 credits in residence. A nonrefundable \$60.00 admission application fee is charged.

ADMISSION WITH GRADUATE STANDING

To be considered for admission to the Graduate School, an applicant must have a baccalaureate degree from an accredited college or university, as well as a scholastic record, background, or other evidence that indicates the ability to do satisfactory graduate work. See Graduate Admission Procedures in this catalog: <http://catalog.oregonstate.edu/Chapter-Detail.aspx?key=36#Section216>.

ADMISSION OF INTERNATIONAL UNDERGRADUATE STUDENTS

International students are admitted to OSU based on meeting the minimum OSU academic requirements, English language proficiency requirements and evidence of funding requirements (if an F-1 or J-1 visa is needed). Visit the Office of International Admissions online at <http://oregonstate.edu/admissions/international/>.

In general, international applicants must have completed their high school diploma or secondary school certificate with a minimum 3.0 on a 4.0 scale, an average "B" grade (A–F), or the equivalent.

Applicants transferring from a recognized college or university outside the U.S. must have a cumulative grade-point average of 2.5, meet OSU's math requirement for transfer students (if you have earned 36 or more transferrable credits) AND be eligible to return to the most recent institution attended.

Applicants transferring from a regionally accredited college or university in the U.S. must have a cumulative grade-point average of 2.25, meet OSU's math and writing requirements for transfer students (if you have earned 36 or more transferrable credits), AND be eligible to return to the most recent institution attended.

Applicants for a bachelor's degree must submit official records of all secondary, middle and high schools attended (in general, these represent years 9–12) AND all colleges, universities and/or professional schools attended. Results of comprehensive examinations are required in the original language and on the official form of the institution, government, or other examining or certifying agency.

Applicants must present proof of English language proficiency, if available, by submitting TOEFL, IELTS or an acceptable alternative, e.g. IGCSE, SAT, ACT, or AP results.

Exceptions to the English proficiency test requirement are:

- Individuals who have completed a bachelor's degree from a regionally accredited institution in the U.S. or other English speaking country (See list below).
- Citizens of the following countries: Anguilla, Antigua and Barbuda, Australia, Bahamas, Barbados, Belize, Bermuda, British Virgin Islands, Canada (English speaking provinces), Cayman Islands, Dominica, Grenada, Ireland, Jamaica, Montserrat, New Zealand, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, Turks and Caicos, United Kingdom, U.S. Virgin Islands.

** For citizens of African countries whose official language is English, waivers will be

considered on a case-by-case basis if the medium of instruction is English.

INTO OSU PATHWAY PROGRAMS:

Undergraduate Pathway

INTO Oregon State University's Undergraduate Pathway programs combine intensive language study, academic skills development and academic course work in a carefully constructed program designed to move students successfully through one to three terms of undergraduate study in their degree program. Entry requirements vary based on the length of program chosen. All students have a study plan and receive academic advising that is reflective of their specific Undergraduate Pathway program.

Successful completion of Undergraduate Pathway progression requirements allows students to complete one to three terms of undergraduate study and progress to their undergraduate degree at Oregon State University in their respective field of study.

Conditional Undergraduate Pathway

Academically qualified applicants for Undergraduate Pathway who are unable to provide a language proficiency score (or provide one that is below the minimum) will be conditionally admitted to the Undergraduate Pathway program and required to complete INTO OSU Academic English through Level 4 before beginning the OSU academic course work portion of the program. All students have a study plan and receive academic advising that is reflective of their specific Conditional Undergraduate Pathway program.

Graduate Pathway

INTO Oregon State University's Graduate Pathway program is a pre-Master's program that provides international students a direct path to various graduate degrees at the university. The program gives students the academic foundation, essential language skills and GMAT/GRE test preparation to successfully move on to the Master's degree. Entry to this program requires satisfactory completion of a four-year undergraduate degree in an appropriate subject with at least a 2.75 GPA or equivalent overall and a minimum of 2.75 GPA for the final year of study and a 70 iBT TOEFL or equivalent test score (some options have higher entry requirements). All students have a study plan and receive academic advising that is reflective of their specific Graduate Pathway program.

Successful completion of Graduate Pathway progression requirements secures students a place in full-time graduate studies at Oregon State University in their respective field of study.

Conditional Graduate Pathway
Academically qualified applicants for Graduate Pathway who are unable to provide a language proficiency score (or provide one that is below the minimum) will be conditionally admitted to the Graduate Pathway program and required to complete INTO OSU Academic English through Level 5 before beginning the OSU academic course work portion of the program. All students have a study plan and receive academic advising that is reflective of their specific Conditional Graduate Pathway program.

When to Apply: International Undergraduate Students

The Office of International Admissions recommends that international undergraduate applicants submit a complete application and supporting documents preferably 4 to 6 months before the intended term start date.

Term	Start Date (First day of classes)
Summer 2014	June 23
Fall 2014	September 29
Winter 2015	January 5
Spring 2015	March 30
Summer 2015	June 22

For information about Admission of International Graduate Students, please see the Graduate Admissions Requirements section at <http://catalog.oregonstate.edu/ChapterDetail.aspx?key=36#Section1787>.

ADMISSION TO SUMMER SESSION

Students who wish to begin work on a degree during summer session at OSU must satisfy regular admission requirements and apply by the specified deadlines.

ADMISSION TO PROFESSIONAL PROGRAMS

Professional programs are accredited according to requirements set by professional societies. These programs often have more rigorous requirements for admission, continuation in the program, and acceptance of transfer credit. Therefore, admission to OSU is separate from admission to a professional program and does not guarantee such admission.

OSU-CASCADES CAMPUS

OSU-Cascades in Bend is a branch campus of Oregon State University that provides OSU's excellence in academics and innovative research, as well as the lifelong advantages of a premier research university. Within 18 undergraduate majors, 30 minors and options, and three graduate programs, students take classes with an average of only 17 students. Field studies, research projects, and internships and international opportunities are available to all students. A partner-

ship with Central Oregon Community College allows students to take lower-division courses before transitioning to OSU-Cascades for upper-division courses. The branch campus plans to expand to a four-year university beginning fall 2015. For information call 541-322-3100 or visit <http://www.osucascades.edu/>.

DEGREE PARTNERSHIP PROGRAMS - DUAL ADMISSION AND ENROLLMENT AT DESIGNATED COMMUNITY COLLEGES

Oregon State University offers special Degree Partnership Programs (dual admission and enrollment) with most of Oregon's community colleges:

1. Blue Mountain Community College in Pendleton
2. Central Oregon Community College in Bend
3. Chemeketa Community College in Salem
4. Clackamas Community College in Oregon City
5. Clatsop Community College in Astoria
6. Columbia Gorge Community College in The Dalles
7. Klamath Community College in Klamath Falls
8. Lane Community College in Eugene
9. Linn-Benton Community College in Albany
10. Mt. Hood Community College in Gresham
11. Oregon Coast Community College in Newport
12. Portland Community College
13. Rogue Community College in Medford [Pending]
14. Southwestern Oregon Community College in Coos Bay
15. Tillamook Bay Community College in Tillamook
16. Treasure Valley Community College in Ontario [Pending]
17. Umpqua Community College in Roseburg

OSU also has Degree Partnership Programs with four of Hawaii's seven community colleges:

1. Hawai'i Community College in Hilo, Hawaii (Big Island)
2. Kapi'olani Community College in Honolulu, Oahu
3. Leeward Community College in Pearl City, Oahu [Pending]
4. Maui College, University of Hawaii, in Kahului, Maui

These programs provide students with simultaneous access and admission/enrollment status at both OSU and the community college. There is one application process to attend both schools, advising is available at either campus, and the student has the opportunity to access services and participate in college life on both campuses. There is flexibility

in scheduling with access to more classes, financial aid is available for qualified students while attending both schools, and admitted students have access to library and computer lab resources at both campuses. For more information on Degree Partnership Programs (dual admission and enrollment), please contact the admissions office at the community college, OSU Degree Partnership Student Services Manager: 541-737-2790, or the University Partnership Programs Web page at <http://oregonstate.edu/partnerships/>.

Application deadlines for Degree Partnership Programs vary. Please refer to the DPP website at <http://oregonstate.edu/partnerships/application-deadlines> to assure that you meet the appropriate deadline.

CREDIT FOR MILITARY EXPERIENCE

Students are recommended to seek advice from their Academic Advisor prior to transferring in their Military Credits. Oregon State University grants up to 45 credits for military education as recommended by the American Council on Education's (ACE) *Guide to the Evaluation of Educational Experiences in the Armed Services*. This is in accordance with transfer credit policies at Oregon State University. Students may request evaluation of military credit by furnishing the Office of Admissions with a Joint Services Transcript or Navy SMART transcript or U.S. Coast Guard transcript. Transcripts may be obtained through these homepages:

- JST (<https://jst.doded.mil/official.html>) **Note:** Some browser security settings may raise a caution message before entering these Department of Defense websites.
- SMART (<http://www.cnmc.navy.mil/>) (Search for 'Smart Transcripts')
- U.S. Coast Guard Institute (<http://www.uscg.mil/>) (Search for 'Transcripts')
- Additional informational links to other service pages can be found on the ACE website (<http://www.acenet.edu/higher-education/topics/Pages/College-Credit-for-Military-Service.aspx>).

Oregon State University will grant 1.00 quarter credit for the course HHS 241 Lifetime Fitness Lab. For HHS 241 credit to be granted, please submit either the DD214 or an official ACE transcript. Credit will also be granted if one of the following military science courses has been completed successfully: Physical Fitness, Physical Education, or Physical Conditioning. To receive credit, please submit an official transcript from the institution.

Oregon State University will assess and award block transfer credit upon review of your military record. An evaluation report showing block transfer credits will be sent to you. Your major college will

receive a copy of your evaluation report and the ACE recommendation guideline. For a better understanding of how each college uses the 45-credit block of general elective credits there is a web page on the OSU Veterans website (go to <http://oregonstate.edu/veterans/home/>, click on Student Resources, then click on Evaluation of Military Credit) outlining this information. In addition, if you believe a specific military course, training, experience, etc. directly relates to a university course, you can complete a form to petition for Military Credit Course Substitution (go to <http://oregonstate.edu/veterans/home/>, click on Student Resources, then click on Petition for Military Credit Course Substitution).

PLACEMENT EXAMINATIONS

High school seniors planning to enter OSU must take the SAT or the ACT. These tests provide academic advisors with valuable information about a student's educational development, abilities, and aptitudes.

New students are required to take an online Math Placement Test (see http://www.math.oregonstate.edu/mlc_placement). Students who enter the university with previous language training from another institution and who wish to continue their study of the language are required to take a language proficiency examination to determine placement level. Please call the OSU School of Language, Culture, and Society at 541-737-4603. Other placement examinations may be required in certain majors.

REGISTRATION PROCEDURES

Once admitted to Oregon State University, students are eligible for course registration. Complete registration instructions, procedures, schedules and deadlines are detailed in the Schedule of Classes on the Web. A student is officially registered and eligible to attend classes only when all procedures have been completed. Students who make arrangements to pay outstanding university debts and who do not adhere to the agreed upon plan may be dis-enrolled.

In addition to the basic information regarding registration, the *Registration Information Handbook* is an essential resource to the student for the academic calendar, fee schedule, academic and other student regulations and procedures, final examination schedule, and listing of baccalaureate core courses.

RE-ENROLLMENT

Undergraduate students who wish to re-enroll in the university after an absence may do so providing they were eligible to re-enroll their last term of attendance. Students who have been absent four or more terms, not including summer terms, should contact the Registrar's Of-

fice to reactivate their records, at which time the current catalog becomes their catalog of record for graduation requirements. The university reserves the right to consider a student's status with respect to voluntary or involuntary leave, as well as any existing student conduct issues when requesting to re-enroll. Students who have been absent less than four terms are still considered active and register following the registration instructions in the current Registration Information Handbook in PDF format in the online catalog at <http://catalog.oregonstate.edu/Default.aspx?section=Registration>. International students who wish to re-enroll after an absence should check in with International Student Advising and Services (ISAS) to make sure they have the required documents to return.

Re-enrolling students who have attended another college or university since their last term at OSU are required to report that enrollment at the time of re-entry. Official transcripts must be forwarded to the Office of Admissions. Returning students with an OSU cumulative GPA below or very near 2.00 are reminded of the OSU graduation requirement (Academic Regulation 25e), which stipulates 2.00 as the minimum OSU cumulative grade-point average required to earn a baccalaureate degree from OSU.

All re-enrolling students are reminded of their responsibility to update any outdated information, such as address, in their OSU records. Contact the Registrar's Office to make changes.

OREGON TRANSFER MODULE-OSU VERSION

The Oregon Transfer Module (OTM) provides a one-year curriculum for students who plan to transfer to a state of Oregon two-year or four-year college/university of higher education. The Oregon Transfer Module is neither a certificate nor a degree; it represents the successful completion of certain general education courses. OTM completion will be noted in the student's record. The Oregon Transfer Module documents that a student has met a subset of the common general education requirements at all Oregon community colleges and Oregon University System institutions.

The Oregon Transfer Module requirements at Oregon State University are:

- 45 lower-division credits—minimum of 12 credits must be OSU course work according to the attached list
- Minimum grade of C– for each course
- Minimum cumulative GPA 2.0 at time Oregon Transfer Module is completed
- Students are allowed 3 S/U credits per full time term or a maximum of 9 S/U credits in the Oregon Transfer Module.

OSU students planning to complete the Oregon Transfer Module must file the OTM Completion Application with the Registrar's Office. Students should fill out the form when the module is completed or they are in the last term of completion.

Upon successful review by OSU and completion of the Oregon Transfer Module, a notation will be added to the student's OSU record indicating the module is complete and the date. The notation will appear on the transcript as follows:

"Oregon Transfer Module Completed day-month-year"

OREGON TRANSFER MODULE COURSES

Foundational Skills (12–13 credits)

Writing (6 credits)

Select two writing courses from the following:

- HC 199. Honors Writing (3)
- PHL 121. Reasoning and Writing (3)
- WR 121. English Composition (3)
- WR 201. Writing for Media (3)
- WR 214. Writing in Business (3)
- WR 222. English Composition (3)
- WR 224. Introduction to Fiction Writing (3)
- WR 241. Introduction to Poetry Writing (3)

Oral Communication (3 credits)

Select one speech course from the following:

- COMM 111. Public Speaking (3)
- COMM 114. Argument and Critical Disclosure (3)
- COMM 114H. Argument and Critical Disclosure (3)
- COMM 218. Interpersonal Communication (3)
- COMM 218H. Interpersonal Communication (3)

Mathematics (3–4 credits)

Select one mathematics course from the following:

- MTH 105. Introduction to Contemporary Mathematics (3)
- MTH 111. College Algebra (4)
- MTH 112. Elementary Functions (4)
- MTH 211. Foundations of Elementary Mathematics (4)
- MTH 241. Calculus for Management and Social Science (4)
- MTH 245. Mathematics for Management, Life, and Social Sciences (4)
- MTH 251. Differential Calculus (4)
- MTH 251H. Differential Calculus (4)

Introduction to Disciplines (30 credits)

Arts and Letters (9+ credits)

Select a minimum of three courses:

- ART 101. Introduction to the Visual Arts (4)
- ART 204. Introduction to Art History-Western (3)
- ART 205. Introduction to Art History-Western (3)
- ART 206. Introduction to Art History-Western (3)
- ART 207. Indigenous Art of the Americas (3)
- ENG 104. Intro to Literature: Fiction (3)

- ENG 104H. Introduction to Literature: Fiction (3)
- ENG 105. Introduction to Literature: Drama (3)
- ENG 106. Introduction to Literature: Poetry (3)
- ENG 201. Shakespeare (4)
- ENG 202. Shakespeare (4)
- ENG 204. Survey of British Literature: Beginning to 1660 (4)
- ENG 205. Survey of British Literature: Restoration to Romantic Era (4)
- ENG 206. Survey of British Literature: Victorian Era to 20th Century (4)
- ENG 207. Literatures of Western Civilization: Classical-Renaissance (4)
- ENG 208. Literatures of Western Civilization: 18th Century to Present (4)
- ENG 210. Literatures of the World: Asia (4)
- ENG 211. Literatures of the World: Africa (4)
- ENG 212. Literatures of the World: Meso/South America, Caribbean (4)
- ENG 213. Literatures of the World: Middle East (4)
- ENG 215. Classical Mythology (4)
- ENG 221. African-American Literature (4)
- ENG 253. Survey of American Literature: Colonial to 1900 (4)
- ENG 254. Survey of American Literature: 1900 to Present (4)
- ENG 260. Literature of American Minorities (4)
- ENG 275. The Bible as Literature (4)
- FILM 110. Introduction to Film Studies: 1895-1945 (3)
- FILM 125. Introduction to Film Studies: 1945-Present (3)
- FILM 220. Topics in Difference, Power, and Discrimination (4)
- FILM 245. The New American Cinema (4)
- FILM 265. Films for the Future (4)
- FR 270. France Today: Cultures Within and Beyond It's Borders (3)
- LING 208. Western Culture Study Abroad (3)
- LING 209. Cultural Diversity Study Abroad (3)
- LING 251. Language of Oregon (3)
- MUS 101. Music Appreciation I: Survey (3)
- MUS 102. Music Appreciation II: Periods and Genres (3)
- MUS 103. Music Appreciation III: Great Composers (3)
- MUS 108. Music Cultures of the World (3)
- MUS 121. Literature and Materials of Music I (3)
- RUS 231. Russian Culture (3)
- RUS 232. Russian Culture (3)
- RUS 233. Russian Culture (3)
- TA 147. Introduction to the Theatre (3)
- Social Sciences (9+ credits)**
Select a minimum of three courses:
- ANTH 110. Introduction to Cultural Anthropology (3)
- ANTH 208. Western Culture Study Abroad (3)
- ANTH 209. Cultural Diversity Study Abroad (3)
- ANTH 210. Comparative Cultures (3)
- ANTH 251. Language in the USA (3)
- AREC 250. Introduction to Environmental Economics and Policy (3)
- AREC 253. Environmental Law, Policy, and Economics (4)
- AREC 253H. Evolution of US Environmental and Natural Resources Law (4)
- DHE 270. Appearance, Power, and Society (4)
- ECON 201. Introduction to Microeconomics (4)
- ECON 201H. Introduction to Microeconomics (4)
- ECON 202. Introduction to Macroeconomics (4)
- ES 101. Introduction to Ethnic Studies (3)
- ES 212. Survey of Chicano/a-Latino/a Studies II (3)
- ES 213. Contemporary Latino/a Culture and Issues (3)
- ES 221. Survey of African American Studies I (3)
- ES 223. Survey of African American Studies II (3)
- ES 231. *Asian American Studies: Mid-1800s-Present (4)
- ES 233. Contemporary Issues and Cultures in Asian America (3)
- ES 241. Survey of Native Americans and Alaskan Natives (3)
- ES 243. Native American Experience in the 20th Century U.S. (3)
- FST 260. Food Science and Technology in Western Culture (3)
- GEO 105. Geography of the Non-Western World (3)
- GEO 106. Geography of the Western World (3)
- H 150. Environmental Health and Safety: Hits and Near Misses (3)
- H 210. Introduction to Health Services and Organizations (3)
- H 225. Social and Individual Health Determinants (3)
- HDFS 201. Contemporary Families in the U.S. (3)
- HST 101. History of Western Civilization (4)
- HST 101H. History of Western Civilization (4)
- HST 102. History of Western Civilization (4)
- HST 102H. History of Western Civilization (4)
- HST 103. History of Western Civilization (4)
- HST 103H. History of Western Civilization (4)
- HST 104. World History I: Ancient Civilizations (3)
- HST 105. World History II: Middle and Early Modern Ages (3)
- HST 106. World History III: The Modern and Contemporary World (3)
- HST 201. History of the United States (4)
- HST 202. History of the United States (4)
- HST 203. History of the United States (4)
- HST 203H. History of the United States (4)
- NUTR 216. Food in Non-Western Culture (3)
- PHL 150. Great Ideas in Society (3)
- PHL 160. Questions for Meaning: World Religions (3)
- PHL 170. The Idea of God (4)
- PHL 201. Introduction to Philosophy (4)
- PHL 205. Ethics (4)
- PHL 207. Political Philosophy (4)
- PHL 220. World-Views and Values in the Bible (4)
- PHL 251. Knowers, Knowing, and The Known (4)
- PHL 280. Ethics of Diversity (4)
- PS 201. Introduction to United States Government and Politics (4)
- PS 201H. Introduction to US Government Politics (4)
- PS 204. Introduction to Comparative Politics (4)
- PS 205. Introduction to International Relations (4)
- PS 205H. Introduction to International Relations (4)
- PS 206. Introduction to Political Thought (4)
- PS 206H. Introduction to Political Thought (4)
- PSY 201. General Psychology (3)
- PSY 202. General Psychology (3)
- SOC 204. Introduction to Sociology (3)
- SOC 205. Institutions and Social Change (3)
- SOC 206. Social Problems and Issues (3)
- WGSS 223. Women: Self and Society (3)
- WGSS 223H. Women: Self and Society (3)
- WGSS 224. Women: Personal and Social Change (3)
- WGSS 280. Women Worldwide (3)
- Science/Math/Computer Science (12+ credits)**
Select three courses, including at least one biological or physical science with a laboratory.
- ANS 121. Introduction to Animal Sciences (4)
- BI 101. General Biology (4)
- BI 102. General Biology (4)
- BI 103. General Biology (4)
- BI 211. Principles of Biology (4)
- BI 211H. Principles of Biology (4)
- BI 212. Principles of Biology (4)
- BI 212H. Principles of Biology (4)
- BI 213. Principles of Biology (4)
- BI 213H. Principles of Biology (4)
- BOT 101. Botany: A Human Concern (4)
- CH 122. General Chemistry (5)
- CH 123. General Chemistry (5)
- CH 202. Chemistry for Engineering Majors (3)
- CH 231. General Chemistry (4)
- and** CH 261. Laboratory for Chemistry 231 (1)
- CH 232. General Chemistry (4)
- and** CH 262. Laboratory for Chemistry 232 (1)
- CH 233. General Chemistry (4)
- and** CH 263. Laboratory for Chemistry 233 (1)
- CH 224H. Honors General Chemistry (5)
- CH 225H. Honors General Chemistry (5)
- CH 226H. Honors General Chemistry (5)
- CSS 205. Soil Science (4)
- or SOIL 205. Soil Science (4)
- FOR 240. Forest Biology (4)
- GEO 101. The Solid Earth (4)
- GEO 102. The Surface of the Earth (4)
- GEO 201. Physical Geology (4)
- GEO 202. Earth Systems Science (4)
- GEO 203. Evolution of Planet Earth (4)
- MB 230. Introduction to Microbiology (4)
- OC 103. Exploring the Deep: Geography of the World's Oceans (4)
- OC 103H. Exploring the Deep: Geography of the World's Oceans (4)
- PH 104. Descriptive Astronomy (4)
- PH 106. Perspectives in Physics (4)
- PH 201. General Physics (5)
- PH 202. General Physics (5)
- PH 203. General Physics (5)
- PH 211. General Physics with Calculus (4)
- PH 212. General Physics with Calculus (4)
- PH 213. General Physics with Calculus (4)

Electives (3+ credits)

One additional course as required to bring the total to 45. The course may be from any of the Introduction to Disciplines areas (Arts and Letters, Social Science, or Science/Math/Computer Science).

UNIVERSITY DEGREE REQUIREMENTS

Current degree requirements are printed each year in the “Academic Regulations and Procedures” section of the *Registration Information Handbook* and in the electronic or printed *General Catalog*, along with other information on a wide range of topics from minimum credits for full-time status to adding courses. All students are encouraged to review this part of the *Registration Information Handbook* and electronic or printed *General Catalog* each year for the most current information about OSU requirements and procedures.

Students with questions about baccalaureate degree requirements are encouraged to contact their advisor. Students needing assistance in selecting a major or selecting an advisor may wish to call or stop by the college office.

CATALOG YEAR POLICY

Graduation Requirements/ Catalog Contract Policy

When determining the graduation requirements for a given student:

- Students must meet all applicable degree requirements from the published catalog(s).
- The student’s catalog year for institutional and baccalaureate core requirements is established by his or her first term of attendance (matriculation date) at Oregon State University as an admitted student.
- The student’s catalog year for college/major/option/minor requirements is based on the date of declaration of the major/option/minor; consequently, a student’s first (primary) major/option must be in the same catalog year. If a primary option is declared in a subsequent academic year, the primary option will be aligned with the catalog year of the primary major. If the primary option did not exist in the catalog year of the primary major, the primary major will move to the catalog year that the primary option was declared.
- Additionally, while the student’s first major/option must be in the same catalog year, any additional declarations of majors/options/minors will be determined by the declaration dates (and corresponding catalog years). A student, in collaboration with an advisor, can also choose to graduate using a subsequent (to their most recent major declaration date) catalog year within the same major/option.
- At the time of graduation, all continuously enrolled students, including transfer students, may not use a catalog that is more than ten years old. Students may petition their college’s head advisor for an extension of a catalog greater than ten years

prior to their expected graduation term.

- Current OSU policy requires a student to reapply after not enrolling at OSU for four consecutive terms (not including summer terms). The published catalog for the resulting readmission/matriculation date will become the catalog of record for graduation requirements. The Planned Educational Leave Program defined in AR 13.d beginning with the 2011–2012 academic year, provides a mechanism for a student to keep their original catalog of record during a planned absence.
- For Degree Partnership Program students, the first term the student is admitted to OSU will be the matriculation date and will determine the catalog year for institutional and baccalaureate core requirements. The catalog year for college/major/option/minor requirements will be the same as all other OSU students.
- Every effort has been made to ensure the accuracy of information in the OSU General Catalog. However, Oregon State University or the Oregon State Board of Higher Education may find it necessary from time to time to make changes in courses, curricula, or degree requirements. Students already admitted to a program in which such changes have been made will be reasonably accommodated, if possible, to ensure their normal progress toward a degree. A student may, however, still be required to conform to changes in courses, curricula, or degree requirements as deemed necessary by Oregon State University or the Oregon State Board of Higher Education.

THE BACCALAUREATE EXPERIENCE

Oregon State University is committed to creating an atmosphere of intellectual curiosity, academic freedom, diversity, and personal empowerment. This will enable everyone to learn with and from others. This compelling learning experience celebrates knowledge; encourages personal growth and awareness; acknowledges the benefits of diverse experiences, world views, learning styles, and values; and engenders personal and societal values that benefit the individual and society.

OSU develops curricula based on sound disciplinary knowledge and input from practitioners. Students acquire skills and knowledge for a lifetime of learning, and will be involved in scholarly and creative pursuits.

The baccalaureate degree includes:

- the baccalaureate core
- an in-depth study in at least one major; and
- individual elective courses.

Minors are available in many areas

Registrar’s Office
B102 Kerr Admin.
Bldg.
Corvallis, OR
97331-2130
541-737-4048
Email: registrars@oregonstate.edu
Website: <http://oregonstate.edu/registrar/>

ADMINISTRATION

Rebecca Mathern,
Registrar,
541-737-4048

Nancy Laurence,
Associate Registrar,
541-737-0604

Tom Watts,
Associate Registrar,
541-737-4048

Amy Flint,
Assistant Registrar,
541-737-4048

and are required in certain programs. Students should check college, school, program, or departmental requirements.

The Baccalaureate Core (bacc core) Curriculum represents what the OSU faculty believes is the foundation for students' further understanding of the modern world. Informed by natural and social sciences, arts, and humanities, the bacc core requires students to think critically and creatively, and to synthesize ideas and information when evaluating major societal issues. Importantly, the bacc core promotes understanding of interrelationships among disciplines in order to increase students' capacities as ethical citizens of an ever-changing world.

THE BACCALAUREATE CORE

The Oregon State University Baccalaureate Core (<http://catalog.oregonstate.edu/bcc.aspx>) is continually enriched. It emphasizes critical thinking, writing, world cultures, appreciation of differences, the arts, sciences, literature, lifelong fitness, and global awareness in 15 course categories. Over 250 courses are available to meet core requirements. Students must complete a total of 48 credits plus a Writing Intensive Course (WIC) of at least 3 credits.

The Baccalaureate Core Committee determines which courses will satisfy each of the requirements above. WIC courses will be reviewed by the WIC Director and the Baccalaureate Core Committee. The core is governed by the following rules: (1) No more than two courses from any one department may be used by a student to satisfy the Perspectives category of the core. (2) No single course may be used by a student to satisfy more than one subject area of the core even though some courses have been approved in more than one area. (3) Both Synthesis courses may not be taken in the same department.

Defining characteristics of baccalaureate core courses are available at <http://oregonstate.edu/ap/curriculum/baccore.html>. Additional information is available at <http://oregonstate.edu/main/baccalaureate-core>.

The purpose of the writing intensive requirement is to insure that each graduate is prepared to write in the discourse, conventions, and genres of his or her major field.

A student completing requirements for two majors, including double degrees as well as dual majors (one degree with two majors), may request that one WIC course satisfy the WIC requirement for graduation in both majors. **This opportunity is available if and only if:**

1. The discourse, written conventions, and genres of the two majors are closely related, **and**
2. The substitution of a WIC course

from one major for that in another major is approved in writing by the chairs or heads of both departments involved and the approval is placed in the student's academic file.

Students and advisors should be aware that in some cases, the WIC course in a major is an integral part of the degree and substitution may not be appropriate. The final decision rests with the department chair or head.

BACCALAUREATE CORE REQUIREMENTS

Skills Courses

(lower division except WIC) (15)

To support students' success in all courses, the following first-year Skills courses are to be taken and completed satisfactorily within the first 45 hours of OSU-generated credits.

- Writing I (WR 121, must earn at least C–)
- Mathematics (approved list below)
- Speech (approved list below)

To prepare for the upper-division Writing Intensive Course in the major, the following Skills course is to be taken and completed satisfactorily within the first 90 hours of OSU-generated credits:

- Writing II (approved list below)

For transfer students with sophomore standing or above, Writing II and Speech must be completed within the first 45 hours of OSU-generated credits. These requirements apply to all students, whether full time or part time.

Note: *No single course may be used by a student to satisfy more than one area of the core even though some courses are approved for more than one area.*

- Fitness (3)
- Mathematics: MTH 105, *Introduction to Contemporary Mathematics, or higher level mathematics (3)
- Writing I (3)
- Writing II (3)
- Speech (3)

Perspectives Courses (lower and upper division) (24)

No more than two courses from any one department may be used by a student to satisfy the Perspectives category of the core. GEO courses listed under Physical Science are considered to be from a different department than GEO courses listed under any other Perspective category. Choose an additional course from either Physical Science or Biological Science.

- Biological Science (including lab) (4)
- Physical Science (including lab) (4)
- Plus choice of additional physical or biological science (including lab) (4)

Take a minimum of one course in each of the following areas:

- Cultural Diversity (3)
- Literature and the Arts (3)
- Social Processes and Institutions (3)
- Western Culture (3)

Difference, Power, and Discrimination Courses (3)

Synthesis Courses (upper division) (6)

Both synthesis courses may not be taken in the same department.

- Contemporary Global Issues (3)
- Science, Technology, and Society (3)

WIC (Writing Intensive Course, upper division, included in credits for major) (3)

Total (48) + WIC (3) = 51

APPROVED BACCALAUREATE CORE COURSES

For the current and complete list of approved baccalaureate core courses, go to <http://catalog.oregonstate.edu/bcc.aspx>.

BACCALAUREATE CORE COURSES

Skills Courses (15)

To support students' success in all courses, the following first-year Skills courses are to be taken and completed satisfactorily within the first 45 hours of OSU-generated credits:

- Writing I (WR 121, minimum passing grade C–)
- Mathematics (approved list below)
- Speech (approved list below)

To prepare for the upper-division Writing Intensive Course in the major, the following Skills course is to be taken and completed satisfactorily within the first 90 hours of OSU-generated credits:

- Writing II (approved list below)

For transfer students with sophomore standing or above, Writing II and Speech must be completed within the first 45 hours of OSU-generated credits. These requirements apply to all students, whether full time or part time.

Fitness (3)

Choose HHS 231, plus a 1-credit course from HHS 241-HHS 248 listed below or any PAC course:

- HHS 231 LIFETIME FITNESS FOR HEALTH (2)
- HHS 241 LIFETIME FITNESS (1)
- HHS 242 LIFETIME FITNESS FOR HEALTH: CARDIO CONDITIONING LAB (1)
- HHS 243 LIFETIME FITNESS: RESISTANCE TRAINING (1)
- HHS 244 LIFETIME FITNESS: WEIGHT MANAGEMENT (1)
- HHS 245 LIFETIME FITNESS: RUNNING (1)
- HHS 246 LIFETIME FITNESS: WALKING (1)
- HHS 247 LIFETIME FITNESS: AQUATIC EXERCISE (1)
- HHS 248 LIFETIME FITNESS: YOGA (1)

Mathematics (3)

- MTH 105 INTRODUCTION TO CONTEMPORARY MATHEMATICS (3)

MTH 111 COLLEGE ALGEBRA (4)
 MTH 112 ELEMENTARY FUNCTIONS (4)
 MTH 211 FOUNDATIONS OF ELEMENTARY MATHEMATICS (4)
 MTH 241 CALCULUS FOR MANAGEMENT AND SOCIAL SCIENCE (4)
 MTH 245 MATHEMATICS FOR MANAGEMENT, LIFE, AND SOCIAL SCIENCES (4)
 MTH 251 DIFFERENTIAL CALCULUS (4)
 MTH 251H DIFFERENTIAL CALCULUS (4)

Speech (3)

COMM 111 PUBLIC SPEAKING (3)
 COMM 111H PUBLIC SPEAKING (3)
 COMM 114 ARGUMENT AND CRITICAL DISCOURSE (3)
 COMM 114H ARGUMENT AND CRITICAL DISCOURSE (3)
 COMM 218 INTERPERSONAL COMMUNICATION (3)
 COMM 218H INTERPERSONAL COMMUNICATION (3)

Writing I (3)

WR 121 ENGLISH COMPOSITION (3)

Writing II (3)

HC 199 HONORS WRITING (3)
 PHL 121 REASONING AND WRITING (3)
 WR 201 WRITING FOR MEDIA (3)
 WR 214 WRITING IN BUSINESS (3)
 WR 222 ENGLISH COMPOSITION (3)
 WR 224 INTRODUCTION TO FICTION WRITING (3)
 WR 240 INTRODUCTION TO NONFICTION WRITING (3)
 WR 241 INTRODUCTION TO POETRY WRITING (3)
 WR 303 WRITING FOR THE WEB (3)
 WR 323 ENGLISH COMPOSITION (3)
 WR 324 SHORT STORY WRITING (4)
 WR 327 TECHNICAL WRITING (3)
 WR 330 UNDERSTANDING GRAMMAR (3)
 WR 341 POETRY WRITING (4)
 WR 362 SCIENCE WRITING (3)

PERSPECTIVE COURSES (24)

No more than two courses (or lecture/lab combinations) from any one department may be used by a student to satisfy the Perspectives category of the core. GEO courses listed under Physical Science are considered to be from a different department than GEO courses listed under any other Perspective category. Choose one Biological Science lecture/lab combination, one Cultural Diversity, one Literature and the Arts, one Physical Science lecture/lab combination, one Social Processes and Institutions, one Western Culture, one Difference, Power, and Discrimination, plus one additional lecture/lab combination from either Physical Science or Biological Science.

Biological Science (Lecture/Lab) (4 or 8)

Choose 1 or 2 lecture/lab combinations. Combination is assumed (uses the same number) unless indicated in the title.

ANS 121 INTRODUCTION TO ANIMAL SCIENCES (4)

ANS 121H INTRODUCTION TO ANIMAL SCIENCE (4)
 BI 101 GENERAL BIOLOGY (4)
 BI 102 GENERAL BIOLOGY (4)
 BI 103 GENERAL BIOLOGY (4)
 BI 211 PRINCIPLES OF BIOLOGY (4)
 BI 211H PRINCIPLES OF BIOLOGY (4)
 BI 212 PRINCIPLES OF BIOLOGY (4)
 BI 212H PRINCIPLES OF BIOLOGY (4)
 BI 213 PRINCIPLES OF BIOLOGY (4)
 BI 213H PRINCIPLES OF BIOLOGY (4)
 BOT 101 BOTANY: A HUMAN CONCERN (4)
 CSS 205 SOIL SCIENCE (4)
 FES 240 FOREST BIOLOGY (4)
 MB 230 INTRODUCTORY MICROBIOLOGY (4)
 MB 230H INTRODUCTORY MICROBIOLOGY (4)
 SOIL 102 INTRODUCTION TO ENVIRONMENTAL SCIENCE AND SUSTAINABILITY (4)
 SOIL 205 SOIL SCIENCE (4)

Cultural Diversity (3)

ANTH 209 CULTURAL DIVERSITY STUDY ABROAD (3)
 ANTH 210 COMPARATIVE CULTURES (3)
 ANTH 311 PEOPLES OF THE WORLD-NORTH AMERICA (3)
 ANTH 311H PEOPLES WORLD-NORTH AMERICA (3)
 ANTH 313 PEOPLES OF THE WORLD-LATIN AMERICA (3)
 ANTH 314 PEOPLES OF THE WORLD-MIDDLE EAST (3)
 ANTH 315 PEOPLES OF THE WORLD-AFRICA (3)
 ANTH 316 PEOPLES OF THE WORLD-SOUTH AND SOUTHEAST ASIA (3)
 ANTH 317 PEOPLES OF THE WORLD-PACIFIC (3)
 ANTH 318 PEOPLES OF THE WORLD-CHINA (3)
 ANTH 319 PEOPLES OF THE WORLD-JAPAN AND KOREA (3)
 ART 207 INDIGENOUS ART OF THE AMERICAS (3)
 ART 208 INTRODUCTION TO ASIAN ART (3)
 CHN 331 CHINESE CULTURE (3)
 CHN 332 CHINESE CULTURE (3)
 CHN 333 CHINESE CULTURE (3)
 ENG 210 LITERATURES OF THE WORLD: ASIA (4)
 ENG 211 LITERATURES OF THE WORLD: AFRICA (4)
 ENG 212 LITERATURES OF THE WORLD: MESO/SOUTH AMERICA, CARIBBEAN (4)
 ENG 213 LITERATURES OF THE WORLD: MIDDLE EAST (4)
 ENG 213H LITERATURES OF THE WORLD: MIDDLE EAST (4)
 ENG 360 NATIVE AMERICAN LITERATURE (4)
 ES 101 INTRODUCTION TO ETHNIC STUDIES (3)
 ES 231 ASIAN AMERICAN STUDIES: MID-1800S-PRESENT (4)
 ES 241 SURVEY OF NATIVE AMERICANS AND ALASKAN NATIVES (3)
 ES 241H SURVEY OF NATIVE AMERICANS AND ALASKAN NATIVES (3)
 ES 242 FEDERAL-INDIAN RELATIONS IN 19TH CENTURY U.S. AND CANADA (3)
 ES 243 NATIVE AMERICAN EXPERIENCE IN THE 20TH CENTURY U.S. (3)

FR 329 FRANCOPHONE CULTURES IN FILM (3-9)
 FR 329H FRANCOPHONE CULTURES IN FILM (3-9)
 GEO 105 GEOGRAPHY OF THE NON-WESTERN WORLD (3)
 GEO 105H GEOGRAPHY OF THE NON-WESTERN WORLD (3)
 GEO 325 GEOGRAPHY OF AFRICA (3)
 GEO 327 GEOGRAPHY OF ASIA (3)
 GEO 328 GEOGRAPHY OF LATIN AMERICA (3)
 HEBR 231 INTRODUCTION TO JEWISH CULTURE (3)
 HST 104 WORLD HISTORY I: ANCIENT CIVILIZATIONS (3)
 HST 105 WORLD HISTORY II: MIDDLE AND EARLY MODERN AGES (3)
 HST 106 WORLD HISTORY III: THE MODERN AND CONTEMPORARY WORLD (3)
 HST 320 ANCIENT NEAR EAST (4)
 HST 350 MODERN LATIN AMERICA (4)
 HST 350H MODERN LATIN AMERICA (4)
 HST 351 MODERN LATIN AMERICA (4)
 HST 351H MODERN LATIN AMERICA (4)
 HST 352 AFRICANS IN LATIN AMERICAN HISTORY (4)
 HST 381 HISTORY OF AFRICA (4)
 HST 382 HISTORY OF AFRICA (4)
 HST 387 ISLAMIC CIVILIZATION (4)
 HST 388 ISLAMIC CIVILIZATION (4)
 HST 391 TRADITIONAL CHINA AND JAPAN (4)
 HST 392 MODERN CHINA AND JAPAN (4)
 HST 396 GENDER, FAMILY AND POLITICS IN TRADITIONAL CHINA (4)
 HST 397 GENDER, FAMILY AND POLITICS IN MODERN CHINA (4)
 HST 485 POLITICS AND RELIGION IN THE MODERN MIDDLE EAST (4)
 JPN 331 JAPANESE CULTURE (3)
 JPN 332 JAPANESE CULTURE (3)
 JPN 333 JAPANESE CULTURE (3)
 LING 209 CULTURAL DIVERSITY STUDY ABROAD (3)
 MUS 108 MUSIC CULTURES OF THE WORLD (3)
 MUS 108H MUSIC CULTURES OF THE WORLD (3)
 NUTR 216 FOOD IN NON-WESTERN CULTURE (3)
 PHL 160 QUESTS FOR MEANING: WORLD RELIGIONS (4)
 PHL 160H QUESTS FOR MEANING: WORLD RELIGIONS (4)
 PHL 213 INTRODUCTION TO HINDU TRADITIONS (4)
 PHL 214 INTRODUCTION TO ISLAMIC TRADITIONS (4)
 PHL 312 ASIAN THOUGHT (4)
 PHL 315 GANDHI AND NONVIOLENCE (4)
 PHL 315H GANDHI AND NONVIOLENCE (4)
 PHL 371 PHILOSOPHIES OF CHINA (4)
 PHL 371H PHILOSOPHIES OF CHINA (4)
 PS 343 RUSSIAN POLITICS (4)
 QS 462 QUEER THEORIES (3)
 RUS 231 RUSSIAN CULTURE (3)
 RUS 232 RUSSIAN CULTURE (3)
 RUS 233 RUSSIAN CULTURE (3)
 SPAN 237 U.S. LATINO/A IDENTITIES AND CULTURES (3)
 WGSS 235 WOMEN IN WORLD CINEMA (3)

WGSS 235H WOMEN IN WORLD CINEMA (3)
 WGSS 280 WOMEN WORLDWIDE (3)
 WGSS 280H WOMEN WORLDWIDE (3)

Literature and the Arts (3)

ART 101 INTRODUCTION TO THE VISUAL ARTS (4)
 ART 204 INTRODUCTION TO ART HISTORY - WESTERN (3)
 ART 205 INTRODUCTION TO ART HISTORY - WESTERN (3)
 ART 206 INTRODUCTION TO ART HISTORY - WESTERN (3)
 ART 208 INTRODUCTION TO ASIAN ART (3)
 ENG 104 INTRODUCTION TO LITERATURE: FICTION (3)
 ENG 104H INTRODUCTION TO LITERATURE: FICTION (3)
 ENG 105 INTRODUCTION TO LITERATURE: DRAMA (3)
 ENG 106 INTRODUCTION TO LITERATURE: POETRY (3)
 ENG 107 INTRODUCTION TO CREATIVE NONFICTION (3)
 ENG 201 SHAKESPEARE (4)
 ENG 202 SHAKESPEARE (4)
 ENG 204 SURVEY OF BRITISH LITERATURE: BEGINNINGS TO 1660 (4)
 ENG 205 SURVEY OF BRITISH LITERATURE: RESTORATION TO ROMANTIC ERA (4)
 ENG 206 SURVEY OF BRITISH LITERATURE: VICTORIAN ERA TO 20TH CENTURY (4)
 ENG 206H SURVEY OF BRITISH LITERATURE: VICTORIAN ERA TO 20TH CENTURY (4)
 ENG 207 LITERATURE OF WESTERN CIVILIZATION: CLASSICAL-RENAISSANCE (4)
 ENG 208 LITERATURE OF WESTERN CIVILIZATION: 18TH CENTURY TO PRESENT (4)
 ENG 210 LITERATURES OF THE WORLD: ASIA (4)
 ENG 211 LITERATURES OF THE WORLD: AFRICA (4)
 ENG 212 LITERATURES OF THE WORLD: MESO/SOUTH AMERICA, CARIBBEAN (4)
 ENG 213 LITERATURES OF THE WORLD: MIDDLE EAST (4)
 ENG 213H LITERATURES OF THE WORLD: MIDDLE EAST (4)
 ENG 215 CLASSICAL MYTHOLOGY (4)
 ENG 221 AFRICAN-AMERICAN LITERATURE (4)
 ENG 253 SURVEY OF AMERICAN LITERATURE: COLONIAL TO 1900 (4)
 ENG 254 SURVEY OF AMERICAN LITERATURE: 1900 TO PRESENT (4)
 ENG 260 LITERATURE OF AMERICAN MINORITIES (4)
 ENG 260H LITERATURE OF AMERICAN MINORITIES (4)
 ENG 275 THE BIBLE AS LITERATURE (4)
 ENG 275H THE BIBLE AS LITERATURE (4)
 ENG 317 THE AMERICAN NOVEL: BEGINNINGS TO CHOPIN (4)
 ENG 318 THE AMERICAN NOVEL: MODERNIST PERIOD (4)
 ENG 319 THE AMERICAN NOVEL: POST-WORLD WAR II (4)
 ENG 320 STUDIES IN PAGE, STAGE, AND SCREEN (4)
 ENG 321 STUDIES IN WORD, OBJECT, AND IMAGE (4)

ENG 322 STUDIES IN GLOBALISM, TEXT, AND EVENT (4)
 ENG 330 THE HOLOCAUST IN LITERATURE AND FILM (4)
 ENG 362 AMERICAN WOMEN WRITERS (4)
 ENG 362H AMERICAN WOMEN WRITERS (4)
 ENG 374 MODERN SHORT STORY (4)
 ES 334 ASIAN AMERICAN LITERATURE (3)
 FILM 110 INTRODUCTION TO FILM STUDIES: 1895-1945 (3)
 FILM 125 INTRODUCTION TO FILM STUDIES: 1945-PRESENT (3)
 FILM 245 THE NEW AMERICAN CINEMA (4)
 FILM 245H THE NEW AMERICAN CINEMA (4)
 FILM 255 WORLD CINEMA PART I: ORIGINS TO 1968 (4)
 FILM 256 WORLD CINEMA PART II: 1968-PRESENT (4)
 FILM 265 FILMS FOR THE FUTURE (4)
 GER 261 MASTERPIECES OF GERMAN CINEMA (3)
 MUS 101 MUSIC APPRECIATION I: SURVEY (3)
 MUS 101H MUSIC APPRECIATION I: SURVEY (3)
 MUS 102 MUSIC APPRECIATION II: PERIODS AND GENRES (3)
 MUS 102H MUSIC APPRECIATION II: PERIODS AND GENRES (3)
 MUS 103 MUSIC APPRECIATION III: GREAT COMPOSERS (3)
 MUS 103H MUSIC APPRECIATION III: GREAT COMPOSERS (3)
 RUS 232 RUSSIAN CULTURE (3)
 SPAN 236 CONTEMPORARY LATIN AMERICAN CULTURE (3)
 TA 147 INTRODUCTION TO THE THEATRE (3)
 TA 147H INTRODUCTION TO THE THEATRE (3)
 TA 330 HISTORY OF THE THEATRE (3)
 TA 331 HISTORY OF THE THEATRE (3)
 TA 332 HISTORY OF THE THEATRE (3)

Physical Science

(Lecture/Lab or Lab) (4 or 8)

Choose 1 or 2 lecture/lab combinations. Combination is assumed (uses the same number) unless indicated in the title. Courses listed as lab must also have the corresponding Physical Science Lecture from below.

CH 122 GENERAL CHEMISTRY (5)
 CH 123 GENERAL CHEMISTRY (5)
 CH 261 LABORATORY FOR CHEMISTRY 231 (1)
 CH 261H LABORATORY FOR CHEMISTRY 231H (1)
 CH 262 LABORATORY FOR CHEMISTRY 232 (1)
 CH 262H LABORATORY FOR CHEMISTRY 232H (1)
 CH 263 LABORATORY FOR CHEMISTRY 233 (1)
 CH 263H LABORATORY FOR CHEMISTRY 233H (1)
 CH 271 LABORATORY FOR CH 231 FOR CHEMISTRY MAJORS (1)
 CH 271H LABORATORY FOR CH 231H FOR CHEMISTRY MAJORS (1)
 CH 272 LABORATORY FOR CH 232 FOR CHEMISTRY MAJORS (1)

CH 272H LABORATORY FOR CH 232H FOR CHEMISTRY MAJORS (1)
 CH 273 LABORATORY FOR CH 233 FOR CHEMISTRY MAJORS (1)
 CH 273H LABORATORY FOR CH 233H FOR CHEMISTRY MAJORS (1)
 CSS 205 SOIL SCIENCE (4)
 GEO 101 THE SOLID EARTH (4)
 GEO 102 THE SURFACE OF THE EARTH (4)
 GEO 201 PHYSICAL GEOLOGY (4)
 GEO 201H PHYSICAL GEOLOGY (4)
 GEO 202 EARTH SYSTEMS SCIENCE (4)
 GEO 203 EVOLUTION OF PLANET EARTH (4)
 GEO 221 ENVIRONMENTAL GEOLOGY (4)
 OC 103 EXPLORING THE DEEP: GEOGRAPHY OF THE WORLD'S OCEANS (4)
 PH 104 DESCRIPTIVE ASTRONOMY (4)
 PH 104H DESCRIPTIVE ASTRONOMY (4)
 PH 106 PERSPECTIVES IN PHYSICS (4)
 PH 111 INQUIRING INTO PHYSICAL PHENOMENA (4)
 PH 201 GENERAL PHYSICS (5)
 PH 201H GENERAL PHYSICS (5)
 PH 202 GENERAL PHYSICS (5)
 PH 202H GENERAL PHYSICS (5)
 PH 203 GENERAL PHYSICS (5)
 PH 203H GENERAL PHYSICS (5)
 PH 205 SOLAR SYSTEM ASTRONOMY (4)
 PH 206 STARS AND STELLAR EVOLUTION (4)
 PH 207 GALAXIES, QUASARS, AND COSMOLOGY (4)
 PH 211 GENERAL PHYSICS WITH CALCULUS (4)
 PH 211H GENERAL PHYSICS WITH CALCULUS (4)
 PH 212 GENERAL PHYSICS WITH CALCULUS (4)
 PH 212H GENERAL PHYSICS WITH CALCULUS (4)
 PH 213 GENERAL PHYSICS WITH CALCULUS (4)
 PH 213H GENERAL PHYSICS WITH CALCULUS (4)
 SOIL 205 SOIL SCIENCE (4)

Physical Science Lecture (4)

Lectures in this section match with labs from above section. Both the lecture and the corresponding lab must be passed to meet the Physical Science requirement.

CH 231 GENERAL CHEMISTRY (4)
 CH 231H GENERAL CHEMISTRY (4)
 CH 232 GENERAL CHEMISTRY (4)
 CH 232H GENERAL CHEMISTRY (4)
 CH 233 GENERAL CHEMISTRY (4)
 CH 233H GENERAL CHEMISTRY (4)

Social Processes and Institutions (3)

ANTH 110 INTRODUCTION TO CULTURAL ANTHROPOLOGY (3)
 AREC 250 INTRODUCTION TO ENVIRONMENTAL ECONOMICS AND POLICY (3)
 ECON 201 INTRODUCTION TO MICROECONOMICS (4)
 ECON 201H INTRODUCTION TO MICROECONOMICS (4)
 ECON 202 INTRODUCTION TO MACROECONOMICS (4)
 ECON 202H INTRODUCTION TO MACROECONOMICS (4)

- EXSS 312 SOCIOCULTURAL DIMENSIONS OF PHYSICAL ACTIVITY (3)
- H 210 INTRODUCTION TO THE HEALTH CARE SYSTEM (3)
- H 225 SOCIAL AND INDIVIDUAL HEALTH DETERMINANTS (4)
- HDFS 201 CONTEMPORARY FAMILIES IN THE U.S. (3)
- HDFS 240 HUMAN SEXUALITY (3)
- HST 101 HISTORY OF WESTERN CIVILIZATION (4)
- HST 101H HISTORY OF WESTERN CIVILIZATION (4)
- HST 102 HISTORY OF WESTERN CIVILIZATION (4)
- HST 102H HISTORY OF WESTERN CIVILIZATION (4)
- HST 103 HISTORY OF WESTERN CIVILIZATION (4)
- HST 103H HISTORY OF WESTERN CIVILIZATION (4)
- PS 201 INTRODUCTION TO UNITED STATES GOVERNMENT AND POLITICS (4)
- PS 204 INTRODUCTION TO COMPARATIVE POLITICS (4)
- PS 205 INTRODUCTION TO INTERNATIONAL RELATIONS (4)
- PS 205H INTRODUCTION TO INTERNATIONAL RELATIONS (4)
- PSY 201 GENERAL PSYCHOLOGY (3)
- PSY 202 GENERAL PSYCHOLOGY (3)
- SOC 204 INTRODUCTION TO SOCIOLOGY (3)
- SOC 204H INTRODUCTION TO SOCIOLOGY (3)
- SOC 205 INSTITUTIONS AND SOCIAL CHANGE (3)
- WGSS 223 WOMEN: SELF AND SOCIETY (3)
- WGSS 223H WOMEN: SELF AND SOCIETY (3)
- WGSS 224 WOMEN: PERSONAL AND SOCIAL CHANGE (3)
- WGSS 240 WOMEN IN SPORT (3)
- WSE 266 INDUSTRIAL HEMP (3)
- Western Culture (3)**
- ANTH 208 WESTERN CULTURE STUDY ABROAD (3)
- ANTH 312 PEOPLES OF THE WORLD-EUROPE (3)
- ANTH 312H PEOPLES OF THE WORLD-EUROPE (3)
- AREC 253 ENVIRONMENTAL LAW, POLICY, AND ECONOMICS (4)
- ART 204 INTRODUCTION TO ART HISTORY - WESTERN (3)
- ART 205 INTRODUCTION TO ART HISTORY - WESTERN (3)
- ART 206 INTRODUCTION TO ART HISTORY - WESTERN (3)
- CROP 340 PENS AND PLOWS: WRITINGS OF WORKING THE LAND (3)
- CSS 340 PENS AND PLOWS: WRITINGS OF WORKING THE LAND (3)
- ENG 201 SHAKESPEARE (4)
- ENG 202 SHAKESPEARE (4)
- ENG 204 SURVEY OF BRITISH LITERATURE: BEGINNINGS TO 1660 (4)
- ENG 205 SURVEY OF BRITISH LITERATURE: RESTORATION TO ROMANTIC ERA (4)
- ENG 206 SURVEY OF BRITISH LITERATURE: VICTORIAN ERA TO 20TH CENTURY (4)
- ENG 206H SURVEY OF BRITISH LITERATURE: VICTORIAN ERA TO 20TH CENTURY (4)
- ENG 207 LITERATURE OF WESTERN CIVILIZATION: CLASSICAL-RENAISSANCE (4)
- ENG 208 LITERATURE OF WESTERN CIVILIZATION: 18TH CENTURY TO PRESENT (4)
- ENG 215 CLASSICAL MYTHOLOGY (4)
- ENG 253 SURVEY OF AMERICAN LITERATURE: COLONIAL TO 1900 (4)
- ENG 254 SURVEY OF AMERICAN LITERATURE: 1900 TO PRESENT (4)
- ENG 275 THE BIBLE AS LITERATURE (4)
- ENG 275H THE BIBLE AS LITERATURE (4)
- ENG 317 THE AMERICAN NOVEL: BEGINNINGS TO CHOPIN (4)
- ENG 318 THE AMERICAN NOVEL: MODERNIST PERIOD (4)
- ENG 319 THE AMERICAN NOVEL: POST-WORLD WAR II (4)
- EXSS 312 SOCIOCULTURAL DIMENSIONS OF PHYSICAL ACTIVITY (3)
- FILM 110 INTRODUCTION TO FILM STUDIES: 1895-1945 (3)
- FILM 125 INTRODUCTION TO FILM STUDIES: 1945-PRESENT (3)
- FR 270 FRANCE TODAY: CULTURES WITHIN AND BEYOND ITS BORDERS (3)
- FR 270H FRANCE TODAY: CULTURES WITHIN AND BEYOND ITS BORDERS (3)
- FR 331 FRENCH CULTURE AND SOCIETY SINCE THE REVOLUTION (3)
- FR 332 FRENCH CULTURE AND SOCIETY SINCE THE REVOLUTION (3)
- FR 333 FRENCH CULTURE AND SOCIETY SINCE THE REVOLUTION (3)
- FST 260 FOOD SCIENCE AND TECHNOLOGY IN WESTERN CULTURE (3)
- FST 273 WINE IN THE WESTERN WORLD (3)
- GEO 106 GEOGRAPHY OF THE WESTERN WORLD (3)
- GEO 326 GEOGRAPHY OF EUROPE (3)
- GEO 329 GEOGRAPHY OF THE UNITED STATES AND CANADA (3)
- GER 331 GERMAN CULTURE (3)
- GER 332 GERMAN CULTURE (3)
- HST 101 HISTORY OF WESTERN CIVILIZATION (4)
- HST 101H HISTORY OF WESTERN CIVILIZATION (4)
- HST 102 HISTORY OF WESTERN CIVILIZATION (4)
- HST 102H HISTORY OF WESTERN CIVILIZATION (4)
- HST 103 HISTORY OF WESTERN CIVILIZATION (4)
- HST 103H HISTORY OF WESTERN CIVILIZATION (4)
- HST 104 WORLD HISTORY I: ANCIENT CIVILIZATIONS (3)
- HST 105 WORLD HISTORY II: MIDDLE AND EARLY MODERN AGES (3)
- HST 106 WORLD HISTORY III: THE MODERN AND CONTEMPORARY WORLD (3)
- HST 201 HISTORY OF THE UNITED STATES (4)
- HST 201H HISTORY OF THE UNITED STATES (4)
- HST 202 HISTORY OF THE UNITED STATES (4)
- HST 202H HISTORY OF THE UNITED STATES (4)
- HST 203 HISTORY OF THE UNITED STATES (4)
- HST 203H HISTORY OF THE UNITED STATES (4)
- HST 203H HISTORY OF THE UNITED STATES (4)
- LING 208 WESTERN CULTURE STUDY ABROAD (3)
- PHL 150 GREAT IDEAS IN PHILOSOPHY (3)
- PHL 170 THE IDEA OF GOD (4)
- PHL 201 INTRODUCTION TO PHILOSOPHY (4)
- PHL 205 ETHICS (4)
- PHL 205H ETHICS (4)
- PHL 207 POLITICAL PHILOSOPHY (4)
- PHL 207H POLITICAL PHILOSOPHY (4)
- PHL 220 WORLD-VIEWS AND VALUES IN THE BIBLE (4)
- PHL 220H WORLD-VIEWS AND VALUES IN THE BIBLE (4)
- PHL 251 KNOWERS, KNOWING, AND THE KNOWN (4)
- PHL 251H KNOWERS, KNOWING, AND THE KNOWN (4)
- PHL 301 HISTORY OF WESTERN PHILOSOPHY (4)
- PHL 302 HISTORY OF WESTERN PHILOSOPHY (4)
- PHL 303 HISTORY OF WESTERN PHILOSOPHY (4)
- PHL 360 PHILOSOPHY AND THE ARTS (4)
- PHL 365 LAW IN PHILOSOPHICAL PERSPECTIVE (4)
- PS 206 INTRODUCTION TO POLITICAL THOUGHT (4)
- RUS 231 RUSSIAN CULTURE (3)
- RUS 232 RUSSIAN CULTURE (3)
- RUS 233 RUSSIAN CULTURE (3)
- SPAN 331 THE CULTURES OF SPAIN AND PORTUGAL (3)
- SPAN 332 THE CULTURES OF SPAIN AND PORTUGAL (3)
- SPAN 336 LATIN AMERICAN CULTURE (3)
- SPAN 337 LATIN AMERICAN CULTURE (3)
- SPAN 338 LATIN AMERICAN CULTURE (3)
- WSE 266 INDUSTRIAL HEMP (3)
- DIFFERENCE, POWER, AND DISCRIMINATION COURSES (3)**
- AG 301 ECOSYSTEM SCIENCE OF PACIFIC NW INDIANS (3)
- ANTH 251 LANGUAGE IN THE USA (3)
- ANTH 345 BIOLOGICAL AND CULTURAL CONSTRUCTIONS OF RACE (3)
- ANTH 345H BIOLOGICAL AND CULTURAL CONSTRUCTIONS OF RACE (3)
- CSS 381 AGRICULTURE, POWER, DISCRIMINATION, AND SURVIVAL (3)
- DHE 270 APPEARANCE, POWER AND SOCIETY (4)
- ECON 383 THE ECONOMICS OF DISCRIMINATION (4)
- ENG 220 TOPICS IN DIFFERENCE, POWER, AND DISCRIMINATION (4)
- ENG 260 LITERATURE OF AMERICAN MINORITIES (4)
- ENG 260H LITERATURE OF AMERICAN MINORITIES (4)
- ENG 420 STUDIES IN DIFFERENCE, POWER, AND DISCRIMINATION (4)
- ES 212 SURVEY OF CHICANO/A-LATINO/A STUDIES (3)
- ES 213 CONTEMPORARY LATINO/A CULTURE AND ISSUES (3)
- ES 221 SURVEY OF AFRICAN AMERICAN STUDIES I (3)
- ES 221H SURVEY OF AFRICAN AMERICAN STUDIES I (3)

- ES 223 SURVEY OF AFRICAN AMERICAN STUDIES II (3)
- ES 233 ASIAN AMERICAN STUDIES II: ACTIVISM AND EMPOWERMENT (3)
- ES 243 NATIVE AMERICAN EXPERIENCE IN THE 20TH CENTURY U.S. (3)
- ES 351 ETHNIC MINORITIES IN OREGON (3)
- ES 352 ASIAN REPRESENTATION IN HOLLYWOOD AND INDEPENDENT CINEMAS (3)
- ES 431 QUEER OF COLOR CRITIQUES (3)
- ES 452 ETHNICITY IN FILM (3)
- EXSS 475 POWER AND PRIVILEGE IN SPORT (3)
- FILM 220 TOPICS IN DIFFERENCE, POWER, AND DISCRIMINATION (4)
- FW 340 MULTICULTURAL PERSPECTIVES IN NATURAL RESOURCES (3)
- GEO 309 ENVIRONMENTAL JUSTICE (3)
- H 120 HEALTH AND CULTURE: USING THEATRE TO PROMOTE HEALTH (3)
- H 465 PUBLIC HEALTH AND WOMEN: SOCIAL AND POLICY ISSUES (3)
- HDFS 201 CONTEMPORARY FAMILIES IN THE U.S. (3)
- HST 201 HISTORY OF THE UNITED STATES (4)
- HST 201H HISTORY OF THE UNITED STATES (4)
- HST 202 HISTORY OF THE UNITED STATES (4)
- HST 202H HISTORY OF THE UNITED STATES (4)
- HST 203 HISTORY OF THE UNITED STATES (4)
- HST 203H HISTORY OF THE UNITED STATES (4)
- HST 210 RELIGION IN THE UNITED STATES (4)
- HST 210H RELIGION IN THE UNITED STATES (4)
- HST 368 LESBIAN AND GAY MOVEMENTS IN MODERN AMERICA (4)
- HST 369 IMMIGRATION TO THE U.S. SINCE 1880 (4)
- HST 370 SOCIAL CHANGE AND AMERICAN POPULAR MUSIC (4)
- LING 251 LANGUAGES OF OREGON (3)
- LING 251H LANGUAGES OF OREGON (3)
- MB 330 DISEASE AND SOCIETY (3)
- PHL 210 RELIGION IN THE UNITED STATES (4)
- PHL 210H RELIGION IN THE UNITED STATES (4)
- PHL 280 ETHICS OF DIVERSITY (4)
- PS 363 GENDER AND RACE IN AMERICAN POLITICAL THOUGHT (4)
- PS 375 THE CIVIL RIGHTS MOVEMENT AND POLICIES (4)
- PS 425 GENDER AND THE LAW (4)
- PS 425H GENDER AND THE LAW (4)
- PSY 426 PSYCHOLOGY OF GENDER (4)
- PSY 466 FAT STUDIES (4)
- QS 262 INTRODUCTION TO QUEER STUDIES (3)
- QS 262H INTRODUCTION TO QUEER STUDIES (3)
- QS 364 TRANSGENDER POLITICS (3)
- QS 431 QUEER OF COLOR CRITIQUES (3)
- SOC 206 SOCIAL PROBLEMS AND ISSUES (3)
- SOC 312 SOCIOLOGY OF THE FAMILY (4)
- SOC 312H SOCIOLOGY OF THE FAMILY (4)
- SOC 360 POPULATION TRENDS AND POLICY (4)
- SOC 426 SOCIAL INEQUALITY (4)
- SPAN 470 ADVANCED SPANISH COORDINATED STUDIES (1-30)
- TA 360 MULTICULTURAL AMERICAN THEATRE (3)
- TA 360H MULTICULTURAL AMERICAN THEATRE (3)
- TCE 216 PURPOSE, STRUCTURE, & FUNCTION OF EDUCATION IN A DEMOCRACY (3)
- TCE 216H PURPOSE, STRUCTURE, & FUNCTION OF EDUCATION IN A DEMOCRACY (3)
- WGSS 223 WOMEN: SELF AND SOCIETY (3)
- WGSS 223H WOMEN: SELF AND SOCIETY (3)
- WGSS 224 WOMEN: PERSONAL AND SOCIAL CHANGE (3)
- WGSS 230 WOMEN IN THE MOVIES (3)
- WGSS 262 INTRODUCTION TO QUEER STUDIES (3)
- WGSS 262H INTRODUCTION TO QUEER STUDIES (3)
- WGSS 325 DISNEY: GENDER, RACE, EMPIRE (3)
- WGSS 364 TRANSGENDER POLITICS (3)
- WGSS 414 SYSTEMS OF OPPRESSION IN WOMEN'S LIVES (3)
- WGSS 414H SYSTEMS OF OPPRESSION IN WOMEN'S LIVES (3)
- WGSS 420 HATE, RESISTANCE, AND RECONCILIATION (3)
- WGSS 420H HATE, RESISTANCE, AND RECONCILIATION (3)
- WGSS 431 QUEER OF COLOR CRITIQUES (3)
- WGSS 462 QUEER THEORIES (3)
- WGSS 466 FAT STUDIES (3)
- WGSS 496 FEMINIST THEOLOGIES IN THE UNITED STATES (3)
- WGSS 496H FEMINIST THEOLOGIES IN THE UNITED STATES (3)
- SYNTHESIS COURSES (6)**
The two courses used to fulfill the Synthesis requirement may not be in the same department.
- Contemporary Global Issues (3)**
AMS 350 AMERICAN CULTURE AND THE VIETNAM EXPERIENCE (4)
- ANTH 352 ANTHROPOLOGY, HEALTH, AND ENVIRONMENT (3)
- ANTH 380 CULTURES IN CONFLICT (3)
- ANTH 380H CULTURES IN CONFLICT (3)
- ANTH 383 INTRODUCTION TO MEDICAL ANTHROPOLOGY (3)
- ANTH 446 RURAL ANTHROPOLOGY (4)
- ANTH 473 GENDER, ETHNICITY, AND CULTURE (4)
- ANTH 482 ANTHROPOLOGY OF INTERNATIONAL DEVELOPMENT (4)
- ANTH 484 WEALTH AND POVERTY (3)
- ANTH 488 BUSINESS AND ASIAN CULTURE (3)
- AREC 351 NATURAL RESOURCE ECONOMICS AND POLICY (3)
- AREC 352 ENVIRONMENTAL ECONOMICS AND POLICY (3)
- BA 465 SYSTEMS THINKING AND PRACTICE (4)
- BA 465H SYSTEMS THINKING AND PRACTICE (4)
- BI 301 HUMAN IMPACTS ON ECOSYSTEMS (3)
- BI 306 ENVIRONMENTAL ECOLOGY (3)
- BI 306H ENVIRONMENTAL ECOLOGY (3)
- BI 349 BIODIVERSITY: CAUSES, CONSEQUENCES AND CONSERVATION (3)
- COMM 446 COMMUNICATION IN INTERNATIONAL CONFLICT AND DISPUTES (3)
- CROP 330 WORLD FOOD CROPS (3)
- CSS 330 WORLD FOOD CROPS (3)
- ECON 352 ENVIRONMENTAL ECONOMICS AND POLICY (3)
- ENG 416 POWER AND REPRESENTATION (4)
- ENG 457 COMPARATIVE LITERATURE: COLONIALISM (4)
- ENG 458 COMPARATIVE LITERATURE: POSTCOLONIALISM (4)
- ENG 497 INTERNATIONAL WOMEN'S VOICES (4)
- ENT 331 POLLINATORS IN PERIL (3)
- FE 456 INTERNATIONAL FORESTRY (3)
- FES 365 ISSUES IN NATURAL RESOURCES CONSERVATION (3)
- FOR 365 ISSUES IN NATURAL RESOURCES CONSERVATION (3)
- FOR 456 INTERNATIONAL FORESTRY (3)
- FOR 479 NATURE AND THE HUMAN EXPERIENCE (3)
- FW 325 GLOBAL CRISES IN RESOURCE ECOLOGY (3)
- GEO 300 SUSTAINABILITY FOR THE COMMON GOOD (3)
- GEO 300H SUSTAINABILITY FOR THE COMMON GOOD (3)
- GEO 308 GLOBAL CHANGE AND EARTH SCIENCES (3)
- GEO 330 GEOGRAPHY OF INTERNATIONAL DEVELOPMENT AND GLOBALIZATION (3)
- GEO 350 POPULATION GEOGRAPHY (3)
- H 312 AIDS AND SEXUALLY TRANSMITTED DISEASES IN MODERN SOCIETY (3)
- HDFS 447 FAMILIES AND POVERTY (4)
- HDFS 447H FAMILIES AND POVERTY (4)
- HORT 331 POLLINATORS IN PERIL (3)
- HST 317 WHY WAR: A HISTORICAL PERSPECTIVE (4)
- HST 385 THE ARAB-ISRAELI CONFLICT (4)
- HST 386 MODERN IRAN: REVOLUTION AND ITS AFTERMATH (4)
- HST 386H MODERN IRAN: REVOLUTION AND ITS AFTERMATH (4)
- HST 390 MIDEAST WOMEN: IN THEIR OWN WORDS (4)
- HST 390H MIDEAST WOMEN: IN THEIR OWN WORDS (4)
- HST 425 THE HOLOCAUST IN ITS HISTORY (4)
- HST 425H THE HOLOCAUST IN ITS HISTORY (4)
- HST 465 AMERICAN DIPLOMATIC HISTORY (4)
- HST 465H AMERICAN DIPLOMATIC HISTORY (4)
- HST 485 POLITICS AND RELIGION IN THE MODERN MIDDLE EAST (4)
- HST 488 THE UNITED STATES AND VIETNAM 1945-1995 (4)
- NR 350 SUSTAINABLE COMMUNITIES (4)
- PHL 344 PACIFISM, JUST WAR, AND TERRORISM (4)
- PHL 344H PACIFISM, JUST WAR, AND TERRORISM (4)
- PHL 432 YOGA AND TANTRIC TRADITIONS (4)

- PHL 443 WORLD VIEWS AND ENVIRONMENTAL VALUES (3)
 PHL 443H WORLD VIEWS AND ENVIRONMENTAL VALUES (3)
 PS 345 THE POLITICS OF DEVELOPING NATIONS (4)
 SOC 454 LEISURE AND CULTURE (4)
 SOC 480 ENVIRONMENTAL SOCIOLOGY (4)
 TCS 301 WORLD COMMUNITY IN THE TWENTIETH CENTURY: UNDERDEVELOPMENT (3)
 TOL 479 NATURE AND THE HUMAN EXPERIENCE (3)
 WGSS 350 POLITICS OF MOTHERHOOD IN A GLOBAL CONTEXT (3)
 WGSS 360 MEN AND MASCULINITIES IN A GLOBAL CONTEXT (3)
 WGSS 360H MEN AND MASCULINITIES (3)
 WGSS 380 MUSLIM WOMEN (3)
 WGSS 380H MUSLIM WOMEN (3)
 WGSS 463 GLOBAL SEX WORK AND TRAFFICKING (3)
 WGSS 480 INTERNATIONAL WOMEN (3)
 WGSS 480H INTERNATIONAL WOMEN (3)
 WGSS 495 GLOBAL FEMINIST THEOLOGIES (3)
 WGSS 495H GLOBAL FEMINIST THEOLOGIES (3)
 WSE 470 FORESTS, WOOD, AND CIVILIZATION (3)
 WSE 470H FORESTS, WOOD, AND CIVILIZATION (3)
 Z 349 BIODIVERSITY: CAUSES, CONSEQUENCES, AND CONSERVATION (3)
- Science, Technology, and Society (3)**
 ANS 315 CONTENTIOUS SOCIAL ISSUES IN ANIMAL AGRICULTURE (3)
 ANS 485 CONSENSUS AND NATURAL RESOURCES (3)
 ANTH 330 EVOLUTION OF PEOPLE, TECHNOLOGY, AND SOCIETY (3)
 ANTH 432 THE ARCHAEOLOGY OF DOMESTICATION AND URBANIZATION (3)
 ANTH 481 NATURAL RESOURCES AND COMMUNITY VALUES (3)
 ART 367 HISTORY OF DESIGN (3)
 ATS 320 THE CHANGING CLIMATE (3)
 BB 331 INTRODUCTION TO MOLECULAR BIOLOGY (3)
 BB 332 MOLECULAR MEDICINE (3)
 BI 300 PLAGUES, PESTS, AND POLITICS (3)
 BI 420 VIRUSES IN MODERN SOCIETY (3)
 BI 435 GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK (3)
 BI 435H GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK (3)
 CH 374 TECHNOLOGY, ENERGY, AND RISK (3)
 CS 391 SOCIAL AND ETHICAL ISSUES IN COMPUTER SCIENCE (3)
 CS 391H SOCIAL AND ETHICAL ISSUES IN COMPUTER SCIENCE (3)
 CSS 395 WORLD SOIL RESOURCES (3)
 DHE 462 HISTORY OF THE NEAR ENVIRONMENT II (4)
 ENGR 350 SUSTAINABLE ENGINEERING (3)
 ENGR 350H SUSTAINABLE ENGINEERING (3)
 ENGR 363 ENERGY MATTERS (3)
 ENGR 363H ENERGY MATTERS (3)
 ENSC 479 ENVIRONMENTAL CASE STUDIES (3)
- ENT 300 PLAGUES, PESTS, AND POLITICS (3)
 ES 445 NATIVE AMERICAN SCIENCE AND TECHNOLOGY (3)
 FES 485 CONSENSUS AND NATURAL RESOURCES (3)
 FS 435 GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK (3)
 FS 435H GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK (3)
 FS 477 AGROFORESTRY (3)
 FS 485 CONSENSUS AND NATURAL RESOURCES (3)
 FST 421 FOOD LAW (3)
 FW 350 ENDANGERED SPECIES, SOCIETY AND SUSTAINABILITY (3)
 FW 360 ORIGINS OF F&W MANAGEMENT-EVOLUTION, GENETICS, AND ECOLOGY (3)
 FW 470 ECOLOGY AND HISTORY: LANDSCAPES OF THE COLUMBIA BASIN (3)
 FW 485 CONSENSUS AND NATURAL RESOURCES (3)
 GEO 300 SUSTAINABILITY FOR THE COMMON GOOD (3)
 GEO 300H SUSTAINABILITY FOR THE COMMON GOOD (3)
 GEO 305 LIVING WITH ACTIVE CASCADE VOLCANOES (3)
 GEO 306 MINERALS, ENERGY, WATER, AND THE ENVIRONMENT (3)
 GEO 307 NATIONAL PARK GEOLOGY AND PRESERVATION (3)
 GEO 307H NATIONAL PARK GEOLOGY AND PRESERVATION (3)
 GEO 335 INTRODUCTION TO WATER SCIENCE AND POLICY (3)
 GEO 335H INTRODUCTION TO WATER SCIENCE AND POLICY (3)
 GEO 352 OREGON: GEOLOGY, PLACE, AND LIFE ON THE RING OF FIRE (4)
 GEO 380 EARTHQUAKES IN THE PACIFIC NORTHWEST (3)
 H 445 OCCUPATIONAL HEALTH (3)
 HORT 330 PLAGUES, PESTS, AND POLITICS (3)
 HST 481 ENVIRONMENTAL HISTORY OF THE UNITED STATES (4)
 HSTS 411 HISTORY OF SCIENCE (4)
 HSTS 412 HISTORY OF SCIENCE (4)
 HSTS 413 HISTORY OF SCIENCE (4)
 HSTS 414 HISTORY OF TWENTIETH-CENTURY SCIENCE (4)
 HSTS 415 THEORY OF EVOLUTION AND FOUNDATION OF MODERN BIOLOGY (4)
 HSTS 415H THEORY OF EVOLUTION AND FOUNDATION OF MODERN BIOLOGY (4)
 HSTS 416 HISTORY OF MEDICINE PRE-1800 (4)
 HSTS 417 HISTORY OF MEDICINE (4)
 HSTS 418 SCIENCE AND SOCIETY (4)
 HSTS 419 STUDIES IN SCIENTIFIC CONTROVERSY: METHODS AND PRACTICES (4)
 HSTS 421 TECHNOLOGY AND CHANGE (4)
 HSTS 422 HISTORICAL STUDIES OF SCIENCE AND POLITICS (4)
 HSTS 423 SCIENCE AND RELIGION (4)
 HSTS 425 HISTORY OF THE LIFE SCIENCES (4)
 HSTS 440 HISTORY OF PSYCHOTHERAPY (4)
- HSTS 440H HISTORY OF PSYCHOTHERAPY (4)
 HSTS 470 ECOLOGY AND HISTORY: LANDSCAPES OF THE COLUMBIA BASIN (3)
 IE 380 THE RESPONSIBLE ENGINEER (3)
 NE 319 SOCIETAL ASPECTS OF NUCLEAR TECHNOLOGY (3)
 NMC 421 DIFFUSION OF INNOVATIONS (3)
 NMC 427 DIGITAL PORNOGRAPHY (3)
 NR 477 AGROFORESTRY (3)
 NUTR 312 ISSUES IN NUTRITION AND HEALTH (3)
 PH 313 ENERGY ALTERNATIVES (3)
 PH 331 SOUND, HEARING, AND MUSIC (3)
 PH 332 LIGHT, VISION, AND COLOR (3)
 PHL 325 SCIENTIFIC REASONING (4)
 PHL 325H SCIENTIFIC REASONING (4)
 PHL 444 BIOMEDICAL ETHICS (4)
 PHL 444H BIOMEDICAL ETHICS (4)
 PS 370 SCIENCE, RELIGION, AND POLITICS (4)
 PS 476 SCIENCE AND POLITICS (4)
 RNG 477 AGROFORESTRY (3)
 SOC 456 SCIENCE AND TECHNOLOGY IN SOCIAL CONTEXT (4)
 SOC 481 SOCIETY AND NATURAL RESOURCES (4)
 SOC 485 CONSENSUS AND NATURAL RESOURCES (3)
 SOIL 335 INTRODUCTION TO WATER SCIENCE AND POLICY (3)
 SOIL 395 WORLD SOIL RESOURCES (3)
 SUS 304 SUSTAINABILITY ASSESSMENT (4)
 TOX 360 THE WORLD OF POISONS (3)
 TOX 435 GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK (3)
 TOX 435H GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK (3)
 WGSS 320 GENDER IN TECHNOLOGY (3)
 WGSS 340 GENDER AND SCIENCE (3)
 WGSS 440 WOMEN AND NATURAL RESOURCES (3)
 Z 345 INTRODUCTION TO EVOLUTION (3)
 Z 348 HUMAN ECOLOGY (3)

WRITING INTENSIVE COURSES (WIC) (3)

College of Agricultural Sciences

- AG 421 LEADERSHIP DEVELOPMENT (3)
 ANS 420 ETHICAL ISSUES IN ANIMAL AGRICULTURE (3)
 AREC 434 MEASURING RESOURCE AND ENVIRONMENTAL IMPACTS (4)
 AREC 461 AGRICULTURAL AND FOOD POLICY ISSUES (4)
 BOT 323 FLOWERING PLANTS OF THE WORLD (3)
 BRR 403 THESIS (4)
 CROP 325 AG AND ENVIRONMENTAL PREDICAMENTS: A CASE STUDY APPROACH (3)
 CSS 315 NUTRIENT MANAGEMENT AND CYCLING (4)
 CSS 325 AG AND ENVIRONMENTAL PREDICAMENTS: A CASE STUDY APPROACH (3)
 FST 425 FOOD SYSTEMS CHEMISTRY (4)
 FW 435 WILDLIFE IN AGRICULTURAL ECOSYSTEMS (3)
 FW 439 HUMAN DIMENSIONS OF FISHERIES AND WILDLIFE MANAGEMENT (3)

FW 454 FISHERY BIOLOGY (4)
 FW 497 AQUACULTURE (3)
 HORT 318 APPLIED ECOLOGY OF
 MANAGED ECOSYSTEMS (3)
 SOIL 325 AG AND ENVIRONMENTAL
 PREDICAMENTS: A CASE STUDY
 APPROACH (3)

College of Business

BA 353 PROFESSIONAL DEVELOPMENT (4)
 DHE 370 TEXTILE AND APPAREL MARKET
 ANALYSIS (4)
 DHE 481 PROFESSIONAL PRACTICE IN
 HOUSING AND INTERIOR DESIGN (3)
 GD 412 CONTEMPORARY ISSUES IN
 DESIGN (3)

College of Earth, Ocean, and Atmospheric Sciences

GEO 323 CLIMATOLOGY (4)
 GEO 330 GEOGRAPHY OF
 INTERNATIONAL DEVELOPMENT AND
 GLOBALIZATION (3)
 GEO 427 VOLCANOLOGY (4)
 GEO 463 GEOPHYSICS AND TECTONICS (4)

College of Education

TCE 340 SUPPORTIVE DIFFERENTIATED
 ENVIRONMENTS (3)

College of Engineering

BEE 469 ECOLOGICAL ENGINEERING
 DESIGN I (4)
 BIOE 490 BIOENGINEERING PROCESS
 DESIGN (4)
 CBEE 414 PROCESS ENGINEERING
 LABORATORY (3)
 CE 418 CIVIL ENGINEERING
 PROFESSIONAL PRACTICE (3)
 CEM 443 PROJECT MANAGEMENT FOR
 CONSTRUCTION (4)
 CS 361 SOFTWARE ENGINEERING I (4)
 ECE 441 ENGINEERING DESIGN PROJECT (3)
 ECE 442 ENGINEERING DESIGN PROJECT (3)
 ECE 443 ENGINEERING DESIGN PROJECT (2)
 IE 497 MIME CAPSTONE DESIGN (4)
 IE 498 MIME CAPSTONE DESIGN (4)
 ME 497 MIME CAPSTONE DESIGN (4)
 ME 498 MIME CAPSTONE DESIGN (4)
 NE 475 NUCLEAR SYSTEMS DESIGN II (4)
 RHP 475 NUCLEAR SYSTEMS DESIGN II (4)

College of Forestry

FE 448 FOREST OPERATIONS PLANNING
 AND SCHEDULING (3)
 FE 450 FOREST OPERATIONS DESIGN I (3)
 FE 451 FOREST OPERATIONS DESIGN II (3)
 FE 460 FOREST OPERATIONS
 REGULATIONS AND POLICY ISSUES (3)
 FES 439 HUMAN DIMENSIONS
 OF FISHERIES AND WILDLIFE
 MANAGEMENT (3)
 FOR 375 EXPERIENTIAL EDUCATION (4)
 FOR 460 FOREST POLICY (4)
 FS 439 HUMAN DIMENSIONS
 OF FISHERIES AND WILDLIFE
 MANAGEMENT (3)
 TOL 375 EXPERIENTIAL EDUCATION (4)
 WSE 453 GLOBAL TRADE IN RENEWABLE
 MATERIALS (3)

College of Liberal Arts

AMS 407 SEMINAR (1-16)
 ANTH 370 CULTURAL ANTHROPOLOGY:
 CONCEPTS AND METHODS (4)
 ANTH 487 LANGUAGE IN GLOBAL
 CONTEXT (4)

ART 368 HISTORY OF PHOTOGRAPHY (3)
 ART 411 CONTEMPORARY ISSUES IN ART (3)
 ART 469 METHODS AND THEORY OF ART
 HISTORY (3)
 COMM 418 INTERPERSONAL
 COMMUNICATION THEORY AND
 RESEARCH (3)
 COMM 422 SMALL GROUP
 COMMUNICATION THEORY AND
 RESEARCH (3)
 COMM 456 RHETORIC: 500 BC TO 500
 AD (3)
 COMM 458 RHETORIC: 500 AD TO 1900 (3)
 COMM 459 CONTEMPORARY THEORIES
 OF RHETORIC (3)
 ECON 428 INTRODUCTION TO
 ECONOMIC RESEARCH (4)
 ECON 439 PUBLIC POLICY ANALYSIS (4)
 ECON 463 EFFICIENCY AND
 PRODUCTIVITY ANALYSIS (4)
 ENG 311 STUDIES IN BRITISH PROSE (4)
 ENG 312 STUDIES IN BRITISH DRAMA (4)
 ENG 313 STUDIES IN BRITISH POETRY (4)
 ENG 407 SEMINAR (1-16)
 ENG 445 STUDIES IN NONFICTION (4)
 ENG 470 STUDIES IN POETRY (4)
 ENG 485 STUDIES IN AMERICAN
 LITERATURE (4)
 ES 354 LITERATURE OF ETHNIC
 MINORITIES IN THE UNITED STATES (3)
 ES 472 INDIGENOUS TWO-SPIRIT AND
 QUEER STUDIES (3)
 FILM 452 STUDIES IN FILM (4)
 FR 439 FRENCH: FRANCOPHONE STUDIES
 (3)
 GER 411 FOURTH-YEAR GERMAN (3)
 HST 369 IMMIGRATION TO THE U.S.
 SINCE 1880 (4)
 HST 407 SEMINAR (5)
 HSTS 415 THEORY OF EVOLUTION AND
 FOUNDATION OF MODERN BIOLOGY (4)
 HSTS 417 HISTORY OF MEDICINE (4)
 HSTS 419 STUDIES IN SCIENTIFIC
 CONTROVERSY: METHODS AND
 PRACTICES (4)
 HSTS 422 HISTORICAL STUDIES OF
 SCIENCE AND POLITICS (4)
 HSTS 425 HISTORY OF THE LIFE SCIENCES
 (4)
 HSTS 437 HISTORY OF ANIMALS IN
 SCIENCE (4)
 LS 428 INTERSECTIONS (3)
 MUS 325 HISTORY OF WESTERN MUSIC (3)
 NMC 301 WRITING FOR THE MEDIA
 PROFESSIONAL (3)
 PHL 407 SEMINAR (1-16)
 PS 300 POLITICAL ANALYSIS (4)
 PS 419 TOPICS IN AMERICAN POLITICS (4)
 PS 429 TOPICS IN JUDICIAL POLITICS (4)
 PS 449 TOPICS IN COMPARATIVE
 POLITICS (4)
 PS 459 TOPICS IN INTERNATIONAL
 RELATIONS (4)
 PS 469 TOPICS IN POLITICAL
 PHILOSOPHY (4)
 PSY 434 BRAIN AND BEHAVIOR METHODS
 (4)
 PSY 440 COGNITION RESEARCH (4)
 PSY 460 ADVANCED SOCIAL RESEARCH
 METHODS (4)
 PSY 470 PSYCHOMETRICS AND
 PSYCHOLOGICAL TESTING (4)
 PSY 480 CLINICAL RESEARCH METHODS (4)

QS 472 INDIGENOUS TWO-SPIRIT AND
 QUEER STUDIES (3)
 SOC 315 METHODS I: RESEARCH DESIGN (4)
 SPAN 438 SELECTED TOPICS IN LUSO-
 HISPANIC CULTURE (3)
 SPAN 439 TOPICS IN MEXICAN CULTURE
 AS EVIDENCED THROUGH MEXICAN
 FILM (3)
 SPAN 470 ADVANCED SPANISH
 COORDINATED STUDIES (1-30)
 TA 332 HISTORY OF THE THEATRE (3)
 TA 444 THEORY AND CRITICISM OF
 THEATRE ARTS (3)
 WGSS 460 WOMEN AND SEXUALITY (3)
 WGSS 472 INDIGENOUS TWO-SPIRIT AND
 QUEER STUDIES (3)
 WR 411 THE TEACHING OF WRITING (4)
 WR 493 THE RHETORICAL TRADITION
 AND THE TEACHING OF WRITING (4)
 WR 495 INTRODUCTION TO LITERACY
 STUDIES (4)

College of Pharmacy

PHAR 432 WRITING IN THE
 PHARMACEUTICAL SCIENCES (2)

College of Public Health and Human Sciences

EXSS 381 ANALYSIS OF CRITICAL ISSUES
 IN EXERCISE AND SPORT SCIENCE (3)
 EXSS 455 PHARMACOLOGY IN ATHLETIC
 TRAINING (3)
 H 434 HEALTH CARE LAW AND
 REGULATION (3)
 H 476 PLANNING AND EVALUATING
 HEALTH PROMOTION PROGRAMS (4)
 HDFS 430 STUDENT TEACHING IN
 EARLY CHILDHOOD DEVELOPMENT &
 EDUCATION (12)
 HDFS 461 PROGRAM DEVELOPMENT AND
 PROPOSAL WRITING (4)
 NUTR 416 CULTURAL ASPECTS OF FOODS
 (3)
 NUTR 439 COMMUNICATIONS IN
 DIETETICS (3)

College of Science

BB 317 SCIENTIFIC THEORY AND
 PRACTICE (3)
 BI 306 ENVIRONMENTAL ECOLOGY (3)
 BI 315 MOLECULAR BIOLOGY
 LABORATORY (3)
 BI 317 SCIENTIFIC THEORY AND
 PRACTICE (3)
 BI 371 ECOLOGICAL METHODS (3)
 BI 385 EMERGING INFECTIOUS DISEASES
 AND EPIDEMICS (3)
 BI 388 SPECIAL TOPICS IN BIOLOGY (3)
 BI 450 MARINE BIOLOGY (16)
 CH 462 EXPERIMENTAL CHEMISTRY II (3)
 CH 463 EXPERIMENTAL CHEMISTRY II (3)
 CH 464 EXPERIMENTAL CHEMISTRY II (3)
 MB 311 MOLECULAR MICROBIOLOGY
 LAB: A WRITING INTENSIVE COURSE (3)
 MB 385 EMERGING INFECTIOUS DISEASES
 AND EPIDEMICS (3)
 MTH 323 MATHEMATICAL MODELING (3)
 MTH 333 FUNDAMENTAL CONCEPTS OF
 TOPOLOGY (3)
 MTH 338 NON-EUCLIDEAN GEOMETRY (3)
 PH 403 THESIS (1-16)
 Z 453 SCIENTIFIC WRITING AND
 BEHAVIORAL OBSERVATIONS (3)

Interdisciplinary Programs

ENSC 479 ENVIRONMENTAL CASE STUDIES (3)

University Honors College

BI 306H ENVIRONMENTAL ECOLOGY (3)
 CH 462H EXPERIMENTAL CHEMISTRY II (3)
 CH 463H EXPERIMENTAL CHEMISTRY II (3)
 CH 464H EXPERIMENTAL CHEMISTRY II (3)
 FILM 452H STUDIES IN FILM (4)
 HSTS 415H THEORY OF EVOLUTION AND FOUNDATION OF MODERN BIOLOGY (4)
 PHL 407H SEMINAR (1-16)

MAJOR PROGRAM

In-depth study in at least one area is required in each baccalaureate degree. Major requirements often include not only courses within the given discipline but also necessary prerequisites and work in related areas.

Students must satisfy all the requirements of their major department and major college. The dean's certification of fulfillment of all requirements of the major college is required.

UPPER-DIVISION COURSES

- Credits in upper-division courses:** minimum 60 (exclusive of upper-division physical education activity courses).
- Credits in each major:** minimum 36, including at least 24 in upper-division courses.

For further details on upper-division course requirements, see Academic Regulation 25c, Institutional Requirements for Baccalaureate Degrees, <http://catalog.oregonstate.edu/ChapterDetail.aspx?key=75#Section2893>.

PRACTICUM COURSES AND INTERNSHIPS

Academic performance is not the sole criterion for admission to and continuation in certain courses and programs at the university, particularly practicum courses and internships. The university may find it necessary to evaluate a person's behavior and background to determine the ability to maintain the standards of professional conduct which are necessary in some disciplines. An evaluation may take into consideration current performance as well as past experiences and actions which could effect the ability to perform in the particular course or program.

GRADE-POINT AVERAGE (GPA)

A minimum GPA of 2.00 on OSU cumulative grade-point average is required. See Academic Regulation 25e, Institutional Requirements for Baccalaureate Degrees, <http://catalog.oregonstate.edu/ChapterDetail.aspx?key=75#Section2893>.

TOTAL CREDITS

A minimum 180 earned credits, which must include:^{4,5}

- Credits in upper-division courses:** minimum 60 (exclusive of upper-division physical education activity courses).
- Credits in each major:** minimum 36, including at least 24 in upper-division courses.

Footnotes:

⁴ Some degree programs may require more than 180 credits.

⁵ Unearned credits are those courses for which a grade of F, N, U, I, W, Y, AUD, or WAU are assigned as a final grade for that course. All other grades are calculated as earned credit.

For further information on total credits required, see Academic Regulation 25c, Institutional Requirements for Baccalaureate Degrees, <http://catalog.oregonstate.edu/ChapterDetail.aspx?key=75#Section2893>.

ACADEMIC STANDING

Oregon State University expects students to maintain satisfactory academic progress toward degree completion. At the conclusion of each term, grade-point averages are calculated and academic standings determined for students seeking a baccalaureate degree according to the criteria outlined in the Grades, Regulations, and Records section of this catalog.

ACADEMIC RESIDENCE REQUIREMENT

Academic Regulation 25f (<http://catalog.oregonstate.edu/ChapterDetail.aspx?key=75#Section2893>), Institutional Requirements for Baccalaureate Degrees, states:

- A minimum of 45 of the last 75 credits must be completed while the student is in academic residence at OSU. "Academic Residence" is defined as OSU courses taken as a degree-seeking student of OSU or courses through one of the following approved special programs: Professional degree programs which require that the student enroll in another institution while finishing the bachelor's degree at OSU or an international study program sponsored by the Oregon University System.
- A minimum of 15 upper-division credits used to meet the preceding residency requirement (1) must be taken in each of the student's majors.
- Credits earned by special examination for credit (Academic Regulation 23) are not considered in academic residence.

OTHER GRADUATION REQUIREMENTS**BA Degree Requirements**

The bachelor of arts (BA) degree is conferred for broad and liberal education in various approved areas of studies (typically humanities, arts, social science, and sciences). Requirements for the BA degree differ from those for a bachelor of science (BS) degree in the same department. Many departments offer only one or the other of the two baccalaureate degrees. Check departmental curricula for detailed information. The BA degree requires second language proficiency, including American Sign Language (ASL), equivalent to that attained at the end of the second year course in the language as certified by the School of Language, Culture, and Society. See the Academic Regulations for more details.

Concurrent and Subsequent Baccalaureate Degrees

Academic Regulation 26: <http://catalog.oregonstate.edu/ChapterDetail.aspx?key=75#Section2894>

a. Concurrent Baccalaureate

Degrees: An undergraduate student may be granted two or more baccalaureate degrees (for example the BA or BS) at the same graduation exercise. The student must:

- Complete institutional, college, and departmental requirements for the degree;
- Complete, for each additional degree, a minimum of 32 credits more than the requirements of the curriculum requiring the least number of credits; and
- Complete each additional 32 credits in residence.

b. Subsequent Baccalaureate

Degree: A student who has received a previous baccalaureate degree from either OSU or another accredited university may be granted a subsequent baccalaureate degree. The student must:

- Complete, for a BA degree, the requirements for foreign language proficiency (AR 25d);
- Achieve a minimum of 2.00 on OSU cumulative grade-point average;
- Complete requirements of the major college and receive the dean's certification; and
- Meet the requirements for a concurrent degree as specified in AR 26a, if a previous baccalaureate degree has been received from OSU. The additional credits may be taken at any time prior to or subsequent to the granting of a previous OSU baccalaureate degree. Students with a baccalaureate degree from another institution

- must meet the Academic Residence requirement in AR 25f.
- c. A student seeking a baccalaureate degree under the provisions of either AR 26a or AR 26b also must satisfy the appropriate residence requirements as defined in AR 25f.

Subsequent Credentials: Minors, Certificates, Options, and Majors

Academic Regulation 27: <http://catalog.oregonstate.edu/ChapterDetail.aspx?key=75#Section2895>

- a. **Subsequent Minors and Certificates:** A student who has received a previous baccalaureate degree from either OSU or another accredited university or college may be granted a subsequent minor or certificate. The student must:
1. Complete current requirements for minor or certificate and receive the dean's approval;
 2. Achieve a minimum of 2.0 OSU cumulative grade-point average on work taken for subsequent credential;
 3. Academic residence: minimum 15 credits in residence.
- b. **Subsequent Options and Majors:** A student who has received a previous baccalaureate degree from OSU may be granted a subsequent option or major credential:
1. Complete current requirements for option or major and receive dean's approval;
 2. Achieve a minimum of 2.0 OSU cumulative grade-point average on work taken for subsequent credential;
 3. Academic residence: minimum 15 credits in residence.
- c. Additional credits necessary for subsequent credentials may be taken prior to or subsequent to the granting of a previous baccalaureate degree.

REQUIREMENTS FOR CERTIFICATES

See individual certificate programs described in this catalog.

REQUIREMENTS FOR ADVANCED DEGREES

For advanced degree requirements see the Graduate School section of this catalog or contact the Graduate School. Students who take courses they wish to apply toward an advanced degree before they have received baccalaureate degrees may have a limited number of credits reserved by petition. Also see Reserving Credits in the Graduate School section. A graduate student also may obtain baccalaureate degrees from Oregon State University by satisfying the requirements for subsequent degrees.

APPLYING FOR BACHELOR'S DEGREE AND GRADUATION

Students should consult with their advisor to check progress toward graduation requirements. Progress will be based on the formally declared major, minors, options, degree, and other applicable requirements. Prior to submitting an application for graduation the student is responsible for verifying that all of the aforementioned components of their declared program(s) are accurate and complete. Applications are submitted via MyOSU to the Office of the Registrar. They may be filed up to three terms before the expected graduation term so progress can be monitored each term. However, applications must be submitted no later than the end of the second week of the term in which the student plans to complete degree requirements. The Registrar's Office checks for total credits, academic residency, total upper-division credits and grade-point average.

Please keep the following in mind when using the online application for graduation:

1. Students should make all necessary changes to their program prior to submitting an application for graduation. In the interest of providing accurate degree audits, it is imperative that the curriculum under which the student applies for graduation accurately reflects their educational goals.
2. Undergraduates must be of senior standing before being eligible to submit an application.
3. Students who wish to change graduation dates or program information after the first application must cancel their existing application for graduation and file a new application in accordance with the stated deadline.
4. Students receiving multiple degrees will need to apply for each degree separately.
5. Students must be a current OSU student (see 'Re-Enrolling Students' below).

Additionally, please be aware that all corresponding transcripts are sealed, meaning the academic record cannot be altered, by the Office of the Registrar 90 days after the conferral of a degree. This ensures that the academic course work that reflects the components that substantiated the awarding of the degree is accurately and permanently recorded.

DEGREES WITH DISTINCTION

Graduates who have completed at least ninety credits at OSU or sixty upper-division credits at OSU, and who have an OSU cumulative GPA of 3.5 or higher, are awarded an OSU degree with distinction as follows:

Academic Distinction	OSU GPA Range	Graduation Honor Cord Color
<i>Cum Laude</i>	3.50–3.69	Orange
<i>Magna Cum Laude</i>	3.70–3.84	Gold
<i>Summa Cum Laude</i>	3.85–4.00	White

These distinctions are noted on diplomas.

UNDERGRADUATE RESEARCH/ARTS FELLOW HONOR DISTINCTION

Oregon State University recognizes significant engagement and accomplishment in undergraduate research and the arts by awarding an honor distinction of "Undergraduate Research/Arts Fellow" to students of all majors upon completion of a significant research or creative arts experience under faculty mentorship. "Research" here is intended to encompass modes of scholarship and inquiry as they are variously practiced and defined in OSU's academic disciplines. Students completing significant creative projects in the arts may receive the honorary distinction "Undergraduate Arts Fellow." The distinction will be noted on the student's transcript, and the student will receive a blue honor cord to be worn at graduation ceremonies.

To qualify for the Undergraduate Research/Arts Fellow distinction:

1. Students must demonstrate involvement in all major phases of their project including conception, implementation, and presentation. This involvement will generally consist of sustained work over multiple quarters resulting in an original contribution relative to the discipline.
2. The project presentation must be to an audience that extends beyond the immediate research group or creative context, for example at a public performance, departmental symposium, the annual Celebration of Undergraduate Excellence, a professional meeting, or through publication in a student or professional journal.
3. Evidence of the presentation must be submitted with the final honorary distinction application and deposited into the OSU Scholars Archive.
4. A member of the OSU Graduate Faculty must endorse the application, verifying satisfaction of the criteria described above.

To apply for the distinction, students should complete the OSU Undergraduate Research/Arts Fellow Honor Distinction Application, which will be made available on the Oregon State Undergraduate Research Framework website (<http://oregonstate.edu/students/research/>). The application includes a detailed narrative description of the project and the student's involvement in specific research/creative tasks, a timeline of the student's project engagement, details of the public presentation, and the Graduate Faculty member's endorsement. Applications are submitted to the head advisor in the students' major college, who will sign the application and transmit to the Office of the Registrar for processing. Applications may be submitted at any time during the undergraduate's career but no later than three weeks prior to a student's anticipated graduation date.

DISSERTATION/THESIS

Upon completion and acceptance of a dissertation/thesis at the conclusion of a program of study, the dissertation/thesis will be recorded on a student's transcript, notating the title and term/year that the dissertation/thesis was accepted by the university.

RE-ENROLLING STUDENTS

Re-enrolling students are reminded that graduation requirements may have changed. Students are responsible for consulting their college for changes in their curriculum. If a program has been discontinued, students cannot expect to continue pursuit of that program. Re-enrolling students are also reminded that individual retention and re-enrollment standards of specific colleges may be in effect.

TRANSFER STUDENTS

Oregon community college students entering OSU who have completed the Associate of Arts Oregon Transfer (AAOT) degree (meeting the OUS-Oregon Community College block transfer agreement) will satisfy the lower-division requirements of the baccalaureate core (except those in the synthesis requirement) and have junior standing for registration.

When entering OSU, Oregon community college students who have completed the Associate of Arts Oregon Transfer (AAOT) degree will have junior standing for registration and will satisfy the lower-division requirements of the baccalaureate core, except those in the synthesis requirement. The AAOT degree meets the OUS-Oregon Community College block transfer agreement.

TRANSFER CREDITS

Decisions on transfer courses meeting specific baccalaureate core (general education requirements) will be made by the Office of Admissions with the Faculty Senate and the Office of Academic Programs. Some requirements may be met by advanced placement or international baccalaureate. For more information, contact the Office of Admissions. Articulation tables for baccalaureate core courses can be found on the Web at http://oregonstate.edu/admissions/transfer/bacc_core_1140.html.

INTRODUCTION

These regulations and procedures are published to assist students by providing information that is essential for planning and pursuing their academic programs. Continuing efforts are made each year by the students, faculty, and administration to revise and improve these regulations in order to enhance the quality of the university's programs and the achievement of educational goals.

Every student is responsible for knowing the academic regulations and for observing the procedures that govern his or her relations with Oregon State University. Unless otherwise specified, these regulations apply to both undergraduate and graduate students. Any question regarding these regulations that cannot be answered by a student's academic advisor should be referred directly to the Office of the Registrar (B102 KAd). Additional information regarding Graduate School policies should be addressed to the Office of the Graduate Dean (A300 KAd).

Some students encounter special problems whose proper solution may require deviations from the academic regulations or procedures. Requests for such deviations in the regulations below must be presented to the Office of the Registrar on petition forms, which are available in that office. Petitions received by the registrar will be forwarded to the proper committee or office for review and appropriate action. Requests for deviations from Graduate School policies should be presented by letter to the graduate dean (See the Graduate School section of this catalog).

Other special problems may involve academic issues such as academic freedom in the classroom or evaluations of a student's academic performance. All students should appeal academic grievances first to the instructor of the course and then to the chair or head of the academic unit in which the course is offered. If the situation is not resolved to the student's satisfaction, an undergraduate student should consult with the head advisor of the college in which the course is offered to obtain further information about appeal procedures of the college or university; a graduate student should consult the dean of the Graduate School regarding academic appeal procedures above the departmental level. (Appeal procedures for other than academic grievances, e.g., grievances regarding student employment, financial aid, housing, discipline, human rights, etc. are outlined in the Student Life Policy and Regulations, which are available on the OSU website under "Student Conduct" or from the Office of Student Leadership and Involvement, 202 Memorial Union. Some of these regulations pertain to both undergraduate and graduate students.

The Graduate School section of this catalog outlines both academic appeal procedures and those relating to the employment of graduate students.)

AR 1. ADMISSION FOR NONDEGREE STUDENTS

- a. Nondegree enrollment status for undergraduate students is designed for students who wish to take undergraduate classes, but do not wish to pursue a degree or a specific postbaccalaureate credential. Nondegree undergraduate students are limited to taking a maximum of 8 credits per term. Nondegree Ecampus, International Exchange, credential and certificate students are not limited to 8 credits per term.
- b. A maximum of 36 credits attempted as a nondegree undergraduate student may be used to satisfy Baccalaureate degree requirements upon admission as a degree-seeking student. The most recent 36 credits (or all credits if fewer than 36) will be applied to the Baccalaureate requirements.
- c. Nondegree enrollment status for graduate students is designed for students who wish to take graduate courses but do not wish to pursue an advanced degree. Nondegree graduate students are not limited as to the number of courses (credits) taken per term.
- d. Credits earned while enrolled as a nondegree graduate student will not necessarily apply to a graduate program upon admission to degree-seeking status. The student should refer to the admission requirements given in the *Graduate School* section of this catalog. Communication with the Graduate School and specific academic programs is advised.
- e. Nondegree students seeking admission to a degree program may do so by filing an undergraduate, postbaccalaureate, or graduate application for admission.

AR 2. CREDIT FROM A TWO-YEAR INSTITUTION (UNDERGRADUATE STUDENTS)

- a. **College Transfer Credits:** Oregon State University accepts for credit toward a baccalaureate degree all college transfer work completed at an Oregon or other accredited community college up to 124 lower-division quarter credits. For Institutional Requirements for Baccalaureate Degrees, see AR 25. Students are encouraged to work with the relevant academic unit to ensure that transfer credits meet department and college requirements

for the degree. It would be unlikely for an individual student to be able to use all 124 credits toward an OSU baccalaureate degree. Transfer credits and grades are not used in calculating the OSU cumulative GPA. Students who hold OSU-approved direct transfer degrees from Oregon or other accredited community colleges (e.g., the Associate of Arts Oregon Transfer) or who have 90 or more credits accepted in transfer will be granted junior standing.¹ Students who hold OSU-approved direct transfer degrees will be considered to have met the Perspectives and Skills (except WIC) areas of the Baccalaureate Core. In addition, they must complete the upper-division Synthesis areas of the core. Students transferring from Oregon or other accredited community colleges who do not hold approved direct transfer degrees ordinarily will be given baccalaureate core credit in the Perspectives and Skills area on a course-by-course basis for work that is judged to be equivalent in content.

- b. **Transfer of Professional-Technical Credits:** a maximum of 12 quarter credits (8 semester credits) of professional-technical course work applicable in an associate's degree or certificate program at an accredited institution can be accepted upon admission to OSU as general elective credit (graded as Pass) and as part of the 124-quarter credit total that can be applied toward a baccalaureate degree.
- c. **Transfer of Professional-Technical Course Credits through Articulation Agreements:** Lower-division OSU credit may be awarded for specific professional-technical community college courses when those courses are validated by articulation agreement with the appropriate OSU department. This may be above the 12 quarter credits of general electives (graded as Pass) allowed when a student is admitted to OSU. Credit will be awarded only upon the recommendation of the appropriate department and college, and approval by the Curriculum Council. Community college professional-technical course work is not equated to upper-division OSU course work. These course credits will count as part of the 124 quarter credits defined in paragraph 2a above. OSU departments who have articulation agreements with community colleges regarding community college professional-technical courses shall review the agreements annually and forward a dated list of the articulated

community college courses to the Curriculum Council.

Footnote:

¹ Junior standing does not necessarily imply that OSU institutional, college, division, and/or departmental requirements, which are normally satisfied by OSU students prior to their junior year, have been satisfied.

AR 3. CREDIT FROM AN UNACCREDITED INSTITUTION (UNDERGRADUATES)

After three terms of work at Oregon State University satisfactory to the Undergraduate Admissions Committee, a student may request validation of work done in an unaccredited institution of collegiate rank. The committee will consider each petition separately and base its decision on all information available. In some instances, informal examinations by the departments concerned may be required. Credit for transfer of professional-technical work will be awarded in accordance with paragraphs 2b and 2c.

AR 4. CLASSIFYING STUDENTS

- a. **Undergraduate students:** A student who has earned at least 45 credits is classified as a sophomore. A student who has earned at least 90 credits is classified as a junior. A student who has earned at least 135 credits is classified as a senior.
- b. **Postbaccalaureate students:** A student holding a baccalaureate degree who is admitted to work toward a second baccalaureate degree or teaching certificate is classified as a postbaccalaureate student.
- c. **Graduate students:** A student who has been admitted to the Graduate School is classified as a graduate student.

AR 5. TRANSFER FROM ONE COLLEGE TO ANOTHER (UNDERGRADUATE STUDENTS)

Registered students may transfer from one college to another at any time. Returning but not-registered students may transfer colleges between the dates of readmission and registration.

AR 6. CHANGE IN CREDITS SCHEDULED

No change may be made in the number of credits specified for the various courses and published in the OSU *General Catalog*.

AR 7. MAXIMUM AND MINIMUM REGISTRATION

- a. The minimum number of credits for which a full-time undergraduate student may register is 12, and the maximum is 19, regardless of the method of grading used for the

classes selected. (In determining the load for students not normally held responsible for physical education, the credits in activity courses in physical education will be disregarded.) The maximum may be extended:

- 1. Up to and including 24 credits when a student has completed in his or her most recent term at least 12 credits in courses other than those graded P/N and S/U with a grade-point average of 3.00 or better or when a student has filed with the registrar a petition approved by his or her advisor and college dean (or head advisor).
 - 2. Over 24 credits by petition approved by a student's advisor and college dean (or head advisor) and the Academic Requirements Committee and filed with the registrar.
- b. The minimum number of credits for a full-time graduate student is 9; the maximum is 16. The maximum can be extended by approval of the dean of the Graduate School.
 - 1. Degree-seeking graduate students must take a minimum of 3 credits for any term in which they are enrolled.
 - 2. The following FTE and credit allowances are permitted for graduate students holding an academic appointment.

FTE	Credits
.15 to .29	15
.30 to .50	12

Appointees on graduate assistantships are limited to the above credits during each term.

AR 8. LATE REGISTRATION

Registration is permitted through the tenth class day of each term. Late fees are assessed in accordance with the fee policies stated in the *Schedule of Classes*.

AR 9. ADMISSION TO CLASS

- a. Instructors will receive lists of students in their classes within two days after the opening of the term. Subsequent lists will include the names of later registrants. Students whose names appear on these lists are officially registered; others are to be referred immediately to the Registrar's Office for completion of registration.
- b. If it is anticipated that the demand for enrollment in a given course will exceed the maximum number that can be accommodated, the department offering the course may designate it in the *Schedule of Classes*

with the code "NSHD" (no-show-drop). A student who is registered for such a course who attends no meetings of the course during the first five school days of the term will be dropped from the course by the instructor, unless the student has obtained prior permission for absence. If such action is taken, the instructor will send written notice through the department to the Registrar's Office, which in turn will notify the student that the course has been dropped from his or her schedule. Students should not assume they have been dropped unless they receive notification from the Registrar's Office. No fee will be charged.

AR 10. ELIGIBILITY

To be eligible to hold office or to participate in any extracurricular activity supervised by Oregon State University, students must meet certain requirements.

- a. For student activities, students are responsible for following the Student Life Policy and procedures.
- b. For participation in intercollegiate athletics, students must meet all institutional Pac-12 and NCAA requirements. Students should contact the Compliance Office in the Department of Intercollegiate Athletics on all such matters.

AR 11. ADDING AND DROPPING COURSES

- a. Students may add courses through the first ten class days of each term, depending on the nature of the course and the availability of space. From the sixth class day through the tenth class day of each term, permission (signature) of the instructor offering the course must be obtained.
- b. A student may drop courses without responsibility for grades through the tenth class day of each term. After the tenth class day of each term courses may not be dropped. Failure to drop a course properly will result in an F grade being recorded; courses properly dropped do not appear on the student's transcript.
- c. Add/drop fees will be assessed in accordance with the fee policies stated in the *Schedule of Classes*.

AR 12. WITHDRAWAL FROM INDIVIDUAL CLASSES

Any student may withdraw from a maximum of 12¹ individual OSU credit bearing classes throughout their undergraduate career² at OSU³. Any student may petition for an exception to this limitation if the justification for withdrawal

is clearly associated with circumstances beyond the student's control. Withdrawal from a class with a W grade begins after the tenth day of classes and continues through the end of the seventh week of classes. After the seventh week of classes, students are expected to complete the program attempted and will receive letter grades (A, B, C, D, F, I, S, U, P, N) for all classes in which enrolled unless they officially withdraw from the university. Procedures for withdrawal from individual classes are outlined in the term *Schedule of Classes*.

Footnotes:

¹ Complete withdrawal from the university, as defined in AR 13, is not included in the maximum of 12 individual OSU classes.

² This regulation applies to undergraduate, postbaccalaureate, and nondegree undergraduate students.

³ The maximum withdrawal count will begin for all students starting fall 2012.

AR 13. WITHDRAWAL FROM THE UNIVERSITY

- Any student in good standing (See AR 22) is entitled to withdraw without prejudice at any time prior to the beginning of finals week. The student may accomplish this by completing the online withdrawal survey available through Online Services.
- Withdrawal from the university prior to the beginning of finals week will result in the grade of W being recorded for each course for which the student is registered.
- When a student's academic progress is interrupted by an emergency situation such as serious illness, accident, or death of a family member, within the last four weeks of the term, and the student submits evidence of such to the registrar, he or she may withdraw from the university with I grades in all subjects.
- Undergraduate Planned Educational Leave Program. The Undergraduate Planned Educational Leave Program (PELP) is a voluntary, temporary, planned interruption or pause in a student's regular, full-time education. Its purpose is to enhance an undergraduate student's prospect of successful completion of their academic program. The PELP provides one opportunity¹ for a student to arrange a voluntary absence for as many as six consecutive regular academic terms (not including the summer terms). The PELP is designed to allow a student to pursue other activities that will assist them in clarifying their educational goals, such as job opportunities and experiences away

from campus, military deployment, time to resolve personal or medical problems, or other similar pursuits. The PELP allows an undergraduate student to temporarily suspend their academic work for a period of time (in accordance with AR 13a, 13b, and 13c above), and resume their studies with minimal procedural difficulties. The PELP \$25 non-refundable application fee allows an undergraduate student to maintain their official standing as a student at OSU and reserves the student's right to keep their original academic catalog² active during their absence. Beginning with the 2011–2012 academic year, all OSU undergraduate students³ are eligible to request leave through the PELP. The university reserves the right to consider a student's current academic standing and any existing student conduct issues prior to approving the voluntary PELP leave request. Students who withdraw from OSU prior to the 2011–2012 academic year and who are away from campus for four or more consecutive regular academic terms (not including summer terms) must re-enroll with OSU to re-establish their relationship as an OSU student and their academic catalog will be reset to the academic year they return to OSU.

Transcript Notation

A notation of the dates of any approved leave will be indicated on each student's official transcript.

Footnotes:

¹ Military deployments are an exception to this limitation. All military personnel who are deployed for military service may submit a voluntary leave request for each deployment.

² In accordance with the university's catalog policy on the inside cover of the *General Catalog*.

³ The PELP began with the 2011–2012 academic year (Summer 2011). Any former OSU students who attended OSU prior to the 2011–2012 academic year and have been absent for four or more consecutive regular academic terms will be held to OSU's prior policy that resets the academic catalog to the catalog in effect at the time they return to OSU.

AR 14. ATTENDANCE

Attendance is one of the most important factors in a student's academic success. Therefore, an instructor may consider attendance in arriving at a student's grade. While attendance should not be the primary factor in determining a student's academic accomplishment in a course, it may be used as a partial measure of performance.

AR 15. HONESTY IN ACADEMIC WORK

The administration of the classroom rests with the instructor. When evidence of academic dishonesty comes to the instructor's attention, the instructor should: (a) document the incident, (b) permit the accused student to provide an explanation, (c) advise the student of possible penalties, and (d) take action. The instructor may impose any academic penalty up to and including an F grade in the course after consulting with his or her department chair and informing the student of the action taken. Using the standard form, the instructor must report the incident and the action taken to his or her department chair, who, in turn, shall forward the report to his or her dean.

If the student is not enrolled in the college or school in which the course is offered, the dean of that college shall forward the report to the dean of the college or school in which the student is enrolled for possible disciplinary action.

Grade penalties imposed as a result of academic dishonesty may be appealed by the student in accordance with the procedures developed by the department and college or school in which the course is offered.

AR 16. FINALS WEEK

- No final, midterm, or comprehensive examinations shall be given during the week preceding final examination week. (Examinations on laboratory work, course material covered by "weekly" or "section" quizzes, television courses, ROTC activities, and physical education activities are allowed.)
- Course work shall continue up to final week. Final examinations shall be given during finals week in accordance with the finals week schedule. If a final examination is not to be given in a course, this action must be approved by the department with notification to the Registrar's Office. Requests for changes in the time of final examinations will be submitted to the Registrar's Office.
- All student petitions for changes in the time of final examinations must be made using forms available from the Registrar's Office. (A summary of university final examination policy is printed on the form.) Petitions for changing final examinations are submitted directly to the instructor. Students may forward disapproved petitions through the dean of the college to the Registrar's Office. Requests to change the assigned final examination time for an entire class must be approved by the Registrar's Office. Final examinations may not

be changed to the week preceding final week without approval of the Academic Requirements Committee.

- d. No extracurricular activities or curricular activities other than examinations and final class meetings shall be scheduled during final week.

AR 17. GRADES

The grading system consists of twelve basic grades, A, A-, B+, B, B-, C+, C, C-, D+, D, D-, and F. The grade of A denotes exceptional accomplishment; B, superior; C, average; D, inferior; F, failure. Other marks are I, incomplete; W, withdrawal; R, thesis in progress; P, pass; N, no-credit; S, satisfactory; U, unsatisfactory; AUD, audited course; WAU, withdrawal from audited course; NG, no basis for a grade (administratively assigned by the Registrar's Office, see below); WC, complete withdrawal.

When a requirement of a course has not been completed for reasons acceptable to the instructor and the rest of the academic work is passing, a report of I (incomplete) may be made and additional time granted. The I is only granted at the discretion of the instructor. The instructor must submit the grade the student will earn if the missing work is not completed. That alternate grade will become the default grade if the missing work is not completed. The instructor documents the deficiency and the deadline for completing the missing work. A record of the deficiency shall be kept on file in the unit or department office. The allotted time awarded shall not exceed one calendar year except by petition* or the time of the degree conferral, whichever comes first. To remove the I grade, the student must complete the deficiency within the allotted time and the instructor will then submit the appropriate grade. If the student fails to complete the work within the allotted time, the Registrar's Office will automatically change the I grade on the student's record to the alternate grade submitted by the instructor at the time the I was given. The alternate grade will be included in the grade point average. Under no circumstances shall a student who earns an A-F grade or an N or U grade have his or her grade changed retroactively to an I grade.

When an instructor does not submit a grade for a student, the Registrar's Office will automatically record an interim Y code. To remove the Y grade, the instructor must submit a Change of Grade with the Registrar's Office. If no such change is made, the Registrar's Office will change the interim Y grade to a grade of NG, either at the end of 1 year or at the time of degree conferral, whichever comes first.

An instructor may move to correct a grade by filing a Change of Grade in

the Registrar's Office. Grade changes for students of a permanently separated instructor will be managed by the department chair of the course involved. Upon permanent separation from the university an instructor's change of grade will not be accepted by the Office of the Registrar. The Office of the Registrar will routinely review grade changes.

**A student may petition via the Office of the Registrar for an extension of the one calendar year deadline with the concurrence of the faculty. An approved petition will grant an extension of a single additional term, with a maximum of three total extensions being possible. An approved petition for an extension of time to remove an incomplete will be voided at the time of degree conferral.*

Click here for sample Contract for Completion of I Grade

AR 18. ALTERNATIVE GRADING SYSTEMS

In addition to traditional letter grading (A-F), Oregon State University has adopted two alternative grading systems to be employed in accordance with the provisions outlined below:

a. Satisfactory/Unsatisfactory (S/U)

- Undergraduate students may elect to be graded on a Satisfactory/Unsatisfactory (S/U) basis in a course (except P/N courses) under the following conditions:

- A maximum of 36 credits of those presented in satisfaction of the baccalaureate degree may have been graded on an S/U basis at Oregon State University.
- A student normally elects the option S/U at the time of registration. Changes either to or from S/U grading will be permitted through the end of the seventh week of any term.
- A student must obtain the approval of his or her academic advisor or dean in order to elect to be graded on an S/U basis.

- Graduate students may elect to take undergraduate courses on the S/U basis except those courses required for the removal of deficiencies. Graduate courses may also be taken on an S/U basis. (Such courses cannot be used as part of a student's graduate program. All other provisions of S/U grading apply to graduate students.)
- A grade of S (satisfactory) shall be equivalent to grades A, A-, B+, B, B-, C+, C, and C-. A grade of U (unsatisfactory) shall be equivalent to grades D+, D, D-, or F.
- Grades of S or U shall have no grade-point equivalents; hence

such grades shall not be included in the computation of grade-point averages. The credit of courses in which an S grade is obtained shall be counted toward graduation. Credits shall not be awarded for U grades.

- Election of S/U grading for a course shall be known only to the student and the academic advisor. Instructors shall enter on grade forms the traditional letter grade (A-F) earned. Automatic conversion to S grades and to U grades will be made in the Registrar's Office. Grades of I, or W may be assigned wherever appropriate.

- In compliance with Section III of the Statement on Student Rights, Freedoms, and Responsibilities (dated April 28, 1969), disclosure or nondisclosure of the traditional letter grades received in courses in which S grades were awarded is recognized as an exclusive right of the individual student. The Registrar's Office is obliged and authorized to honor requests for disclosure, provided that the express consent of the student is obtained.

b. Pass/No Credit (P/N)

- Those courses in which traditional letter grading has been deemed inappropriate because of the nature of the course content or the objectives of the course are graded on a Pass/No Credit (P/N) basis.
- Grades of P or N shall have no grade-point equivalents; hence such grades shall not be included in the computation of grade-point averages. The credits of courses in which a grade of P is obtained shall be counted toward graduation. Credit shall not be awarded for N grades.
- Departments are authorized to designate Pass/No Credit courses, subject to the following guidelines and procedures:
 - The principal criterion for choice of grading system is enhancement of the educational experience for the student;
 - The nature, structure, and/or objectives of a course may suggest that the Pass/No Credit grading system be adopted. It is anticipated that courses graded on this basis will generally fall into one of the following categories: skill-building courses or practicums, courses which stress orientation and awareness rather than academic preparation;

- c. The designation of Pass/No Credit grading for a course will follow the academic college's recommendation and approval by the University Curriculum Council, and in the case of graduate courses, by the Graduate Council. Designation of courses for P/N grading must be completed prior to the opening of the term in which the course is offered and normally prior to preparation of the Schedule of Classes.
4. Courses approved for grading on a Pass/No Credit (P/N) basis are identified in the *General Catalog* course descriptions and in the Schedule of Classes.
- c. Nothing stated in the above paragraphs shall be construed as constituting support for petitions requesting change of grade in courses taken during or prior to spring term, 1971.

AR 19. GRADE POINTS

Grade points are computed on the basis of:

- 4 points for each credit of A grade,
- 3.7 for each credit of A– grade,
- 3.3 for each credit of B+ grade,
- 3.0 for each credit of B grade,
- 2.7 for each credit of B– grade,
- 2.3 for each credit of C+ grade,
- 2.0 for each credit of C grade,
- 1.7 for each credit of C– grade,
- 1.3 for each credit of D+ grade,
- 1.0 for each credit of D grade,
- 0.7 for each credit of D– grade, and
- 0 for each credit of F.

Marks of I, W, P, N, NG, R, S, U, AUD, WAU, and WC are disregarded in the computation of points. The grade-point average (GPA) is the quotient of total points divided by total credits; total credits are the number of term credits in which grades A, B, C, D, and F are received. Thus a person receiving 1 credit of A, 2 credits of B, 3 credits of C, 4 credits of D, 5 credits of F would have 20 grade points (1 x 4 plus 2 x 3 plus 3 x 2 plus 4 x 1 plus 5 x 0). The grade-point average would be 20 (grade points) divided by 15 (credits) equals 1.33. A C average on 15 credits attempted would require 30 grade points; if the student has 20 points, he or she is 10 grade points deficient.

AR 20. REPEATED COURSES

If a student repeats an Oregon State University course, the grade from each attempt¹ will appear on the student's academic record but only the second attempt will count toward the student's institutional credits, requirements, and grade-point average². An academic unit³ may, however, include subsequent at-

tempts after the second attempt to meet individual course degree requirements associated with the baccalaureate core/majors/options/minors/certificates/endorsements. A course may not be repeated on an S/U basis if it was taken previously on a normal grade basis⁴.

Footnotes:

¹ An attempt comprises a final grade in a course where the grade is: A, A–, B+, B, B–, C+, C, C–, D+, D, D–, F, S, U, P, NP or an I/Alternate Grade (where the Alternate Grade is one of these grades).

² Recognized repeatable courses as defined in the Oregon State University course catalog, such as activity courses, research, seminars, and selected topics, do not come under this restriction. Additionally, if a course has been approved as a multiple repeatable course for credit and grade points, each attempt will be included in the institutional credits and grade-point average until it reaches its defined limit (total allowable attempts or credit maximums for the course). Further, the Office of the Registrar will include all courses from the first repeat taken until it reaches the maximum total allowable attempts or credit maximums for the course. All subsequent repeats after the repeat maximum has been reached will be excluded from both institutional credits earned and grade-point average calculations.

³ Academic Unit: College, School, or Department

⁴ Normal Grade Basis is defined as any grade of A, A–, B+, B, B–, C+, C, C–, D+, D, D–, F, or any I/Alternate Grade (where the Alternate Grade is one of these grades).

AR 21. HONOR ROLL

At the close of each term, the OSU Registrar publishes a list containing the names of all undergraduate and postbaccalaureate students who for the term have completed at least 12 graded credits with a grade-point average of 3.50 or above.

AR 22. SATISFACTORY ACADEMIC STANDING (FOR UNDERGRADUATE STUDENTS)

Oregon State University expects students to maintain satisfactory academic progress toward degree completion. At the conclusion of each term, grade-point averages are calculated and academic standings determined for students seeking a baccalaureate degree according to the criteria outlined below. Students whose standings evidence a lack of satisfactory progress will be warned of this condition and advised to seek help from their academic advisors.

- a. **Academic Warning:** Students with a term GPA below 2.0 will be placed on Academic Warning.
- b. **Academic Probation:** Students who have attempted¹ 24 or more credits at OSU and have an OSU cumulative GPA below 2.0 will be placed on Academic Probation. Students who attain a cumulative

GPA of 2.0 or better are removed from Academic Probation.

- c. **Academic Suspension:** Students who are on Academic Probation and have a subsequent term GPA below 2.0 will be placed on Academic Suspension. Academic Suspension is recorded on the student's academic record. Students who are academically suspended are denied all the privileges of the institution and of all organizations in any way connected to it, including any university-recognized living group.
- d. **Reinstatement to the University:** Suspended students will be considered for reinstatement to the university after two years or completion of a minimum of 24 quarter credits of transferable college-level work at an accredited college or university, with a GPA of 2.5 or above.

The Faculty Senate Committee on Academic Standing is charged with the responsibility for enforcement of the above regulations on Satisfactory Academic Standing. Additionally, this committee has discretionary authority to grant exceptions and to develop guidelines for the administration of these regulations.

Footnote:

¹ An attempt comprises a final grade in a course where the grade is: A, A–, B+, B, B–, C+, C, C–, D+, D, D–, F, S, U, P, NP, I/Alternate Grade (where the Alternate Grade is one of these grades), W, or Y.

AR 23. SPECIAL EXAMINATION FOR CREDIT

A regularly enrolled student in good standing, either graduate or undergraduate, currently registered at Oregon State University and wishing credit for an OSU course for which a grade has not been previously received, may petition for credit examination under the following conditions:

- a. The application for such examination shall be presented on an Official Student Petition and shall bear the approvals of the dean of the student's college, the dean of the college in which the course is offered, and head of the department in which the course is offered. Petitions for special examination for credit may be approved or denied at the sole discretion of the department/college or the faculty member offering the course, taking into account both the academic merit of the petition and the department/college's ability to deploy adequate resources to prepare, administer, and grade such an examination.
- b. In no case may such examination be based on work used for graduation from high school, or in a foreign

- language that is the mother tongue of the applicant, or in courses not listed in the Oregon State University General Catalog.
- Grades earned in special examinations shall be submitted and recorded in the same way as for regularly registered courses, and will count with respect to repeating a course as defined in AR 20.
 - A student may not petition for credit by special examination for a course in any term in which the student is or has been enrolled in the course after the add/drop deadline for that term.
 - An examination for credit will not be approved for courses below the level for which college credit has previously been granted.
 - No examination may be taken until the applicant has received a permit from the Registrar's Office, for which a fee of \$80 will be charged.¹
- offering the course, taking into account both the academic merit of the petition and the department/college's ability to deploy adequate resources to prepare, administer, and grade such an examination.
- No examination may be taken until the applicant has received a permit from the Registrar's Office, for which a fee of \$80 will be charged.
 - A minimum grade of C (or equivalent) must be attained in an examination for that waiver to be granted.
 - Credit will not be granted for courses waived.
 - This regulation does not invalidate the right of a dean of a college or head of a department to waive a course requirement of their particular college or department, respectively.

above. WIC courses will be reviewed by the Writing Advisory Board. The core is governed by the following rules: (1) No more than two courses from any one department may be used by a student to satisfy the Perspectives category of the core. (2) No single course may be used by a student to satisfy more than one subject area of the core even though some courses have been approved in more than one area. (3) Both Synthesis courses may not be taken in the same department.³

b. An undergraduate student may be granted a baccalaureate degree with one or more majors.

- c. Credits:** Minimum 180 earned credits, which must include:^{4,5}

1. Credits in upper-division

courses: minimum 60 (exclusive of upper-division physical education activity courses).

2. Credits in each major:

minimum 36, including at least 24 in upper-division courses.

- d. Baccalaureate Degrees:** All students receiving a BA degree shall have proficiency in a second language, including American Sign Language (ASL), equivalent to that attained at the end of the second year sequence with a grade of C– or better as certified by the School of Language, Culture, and Society. Colleges offering both the BA and the BS will have specific requirements distinguishing the two degrees. The college requirements for the two degrees will place comparable demands upon the time and effort of students, and that assessment of comparability will include the foreign language requirement for the BA. Academic units offering both the BA and BS may have specific requirements distinguishing the two degrees.
- e. Grade-Point Average:** minimum of 2.00 on OSU cumulative grade-point average.
- f. Academic Residence:**

- A minimum of 45 of the last 75 credits, or 150 total credits, must be completed while the student is in academic residence at OSU. "Academic Residence" is defined as OSU courses taken as a degree-seeking student of OSU or courses through one of the following approved special programs: Professional degree programs which require that the student enroll in another institution while finishing the bachelor's degree at OSU or an international study

AR 25. INSTITUTIONAL REQUIREMENTS FOR BACCALAUREATE DEGREES

- a. Baccalaureate Core:** Each student will complete the following requirements:

1. Skills Courses (15 credits)

Mathematics, Writing I, and Speech must be taken and completed satisfactorily within the first 45 hours of OSU-generated credits. Writing II must be taken and completed satisfactorily within the first 90 hours of OSU-generated credits.

Fitness (3 credits)
Mathematics (3 credits)
Speech (3 credits)
Writing I (3 credits)
Writing II (3 credits)

2. Perspectives Courses (24 credits)

Physical science (with lab) (4 credits)
Biological science (with lab) (4 credits)
Plus choice of second course in either of the above (with lab) (4 credits)
Take a minimum of one course in each of the following areas:
Western culture (3 credits)
Cultural diversity (3 credits)
Literature and the arts (3 credits)
Social processes and institutions (3 credits)

3. Difference, Power, and Discrimination Courses (3 credits)

4. Synthesis Courses (6 credits) Science, technology, and society (3 credits)

Contemporary global issues (3 credits)

5. Writing Intensive Courses, upper division (WIC) (3 credits)

The Baccalaureate Core Committee determines which courses will satisfy each of the requirements

Footnote:

¹ As an alternative to departmental examinations, students may seek credit through the College Level Examination Program (CLEP) to the College Entrance Examination Board. CLEP includes nationally normed subject matter examinations and general examinations covering material included in a number of relatively standard courses taught in colleges and universities throughout the United States. Some of these subject matter examinations and general examinations have been accepted by departments at this institution. Policy guidelines have been established that make it possible for admitted and enrolled students to (a) transfer credits earned through these accepted CLEP subject matter and general examinations to this institution, providing certain criteria are met, and (b) earn credits through accepted CLEP subject matter and general examinations providing certain criteria are met. Further information about CLEP may be obtained from the Office of Admissions, B104 Kerr Administration Bldg.

AR 24. SPECIAL EXAMINATION FOR WAIVER (UNDERGRADUATE STUDENTS)

A student may petition for examination to waive a course under the following conditions:

- The application for examination to waive a course shall be presented on an Official Student Petition and shall bear the recommendations of the dean of the student's college, the dean of the college in which the course is offered, and head of the department in which the course is offered. Petitions for special examination for waiver may be approved or denied at its sole discretion by the department/college

program sponsored by the Oregon University System.

2. A minimum of 15 upper-division credits used to meet the preceding residency requirement (1) must be taken in each of the student's majors.
3. Credits earned by special examination for credit (AR 23) are not considered in academic residence.

g. Dean's certification of fulfillment of all requirements of major college. (For details, see college advisors and deans.)

h. Restrictions: A maximum number of credits may be applied to the Baccalaureate Degree as follows:

1. Transfer from first professional programs such as Law, Medicine, Pharmacy, and Veterinary Medicine: maximum 48 quarter credits.
2. Music courses (applied music): maximum 12 credits. (This restriction is not applicable to majors in music.)
3. Physical activity courses: maximum 11 credits.
4. Courses graded on an S/U basis at Oregon State University: maximum 36 credits.
5. Academic Learning Service courses: maximum 15 credits.

i. Application for a Degree: To become a candidate for a degree, a student must have achieved senior standing and must make formal application for the degree. It is recommended that the student file an application with the registrar three terms prior to the term in which he or she wishes to graduate. The student's deadline to file an application with the registrar is the end of the second week of the term in which he or she expects to complete requirements for a degree. [Approved by Faculty Senate 1/8/09.]

Footnotes:

³ Lists of approved courses may be obtained from advisors. Approved courses are also listed in the *OSU General Catalog*.

⁴ Some degree programs may require more than 180 credits.

⁵ Unearned credits are those courses for which a grade of F, N, U, I, W, Y, AUD, or WAU are assigned as a final grade for that course. All other grades are calculated as earned credit.

AR 26. CONCURRENT AND SUBSEQUENT BACCALAUREATE DEGREES

a. Concurrent Baccalaureate Degrees: An undergraduate student may be granted two or more baccalaureate degrees (for example the BA or BS) at the same graduation

exercise. The student must:

1. Complete institutional, college, and departmental requirements for the degree;
2. Complete, for each additional degree, a minimum of 32 credits more than the requirements of the curriculum requiring the least number of credits; and
3. Complete each additional 32 credits in residence.

b. Subsequent Baccalaureate

Degree: A student who has received a previous baccalaureate degree from either OSU or another accredited university may be granted a subsequent baccalaureate degree. The student must:

1. Complete, for a BA degree, the requirements for foreign language proficiency (AR 25d);
2. Achieve a minimum of 2.00 on OSU cumulative grade-point average;
3. Complete requirements of the major college and receive the dean's certification; and
4. Meet the requirements for a concurrent degree as specified in AR 26a, if a previous baccalaureate degree has been received from OSU. The additional credits may be taken at any time prior to or subsequent to the granting of a previous OSU baccalaureate degree. Students with a baccalaureate degree from another institution must meet the Academic Residence requirement in AR 25f.

c. A student seeking a baccalaureate degree under the provisions of either AR 26a or AR 26b also must satisfy the appropriate residence requirements as defined in AR 25f.

AR 27. SUBSEQUENT CREDENTIALS: MINORS, CERTIFICATES, OPTIONS, AND MAJORS

a. Subsequent Minors and

Certificates: A student who has received a previous baccalaureate degree from either OSU or another accredited university or college may be granted a subsequent minor or certificate. The student must:

1. Complete current requirements for minor or certificate and receive the dean's approval;
2. Achieve a minimum of 2.0 OSU cumulative grade-point average on work taken for subsequent credential;
3. Academic residence: minimum 15 credits in residence.

b. Subsequent Options and Majors:

A student who has received a previous baccalaureate degree from

OSU may be granted a subsequent option or major credential:

1. Complete current requirements for option or major and receive dean's approval;
 2. Achieve a minimum of 2.0 OSU cumulative grade-point average on work taken for subsequent credential;
 3. Academic residence: minimum 15 credits in residence.
- c.** Additional credits necessary for subsequent credentials may be taken prior to or subsequent to the granting of a previous baccalaureate degree.

AR 28. SUBSTITUTIONS

a. Undergraduate students:

Substitutions for institutional requirements as outlined in AR 25, except for baccalaureate core requirements of AR 25a, may be petitioned to the Academic Requirements Committee after approval by the student's dean or college head advisor. Substitutions for baccalaureate core requirements of AR 25a may be presented for consideration to the student's dean or college head advisor. Substitutions or adjustments of college or departmental requirements are also subject to approval by the college or department.

b. Graduate students: Substitutions for institutional requirements or deviations from the normal Graduate School regulations and policies may be made only by obtaining the approval of the dean of the Graduate School following a petition by means of a letter signed by the student and the student's major professor. Action taken on such substitutions or petitions will not be considered as a precedent for any future action.

AR 29. GRADUATION EXERCISES

Attendance at graduation exercises is optional for graduating students. In accordance with procedures obtained from the Registrar's Office, the candidate is responsible for declaring whether or not he or she will attend commencement, regardless of the term in which requirements are completed.

AR 30. AUDITING COURSES

Audit registration permits a student to enroll in a course for no credit and no grade. Course requirements for an audited course will be determined by the course instructor. Audit registration is available to admitted and non-admitted students. Audit registration begins on the sixth day of registration and ends with the close of registration at the conclusion of the tenth day of class. Those who wish

to audit should contact the Registrar's Office for registration procedures, which will require approval of the course instructor. Audit courses are assessed instructional fees at the same rate as for credit courses. Any changes to an audit registration are subject to the same procedures, deadlines, and special fees as for registration changes to regular courses. Upon completion of an audited course, the designation of AUD will be recorded on the transcript. The designation of WAU will be recorded on the transcript for students who withdraw from an audit course.

AR 31. ACADEMIC FRESH START POLICY

An Oregon State University undergraduate student may petition once with the registrar to exclude OSU courses from the calculation of institutional requirements, credits, and grade-point average, under a condition of academic fresh start defined below:

Conditions to qualify:

The student must have an absence from OSU that begins after the end of the student's last term of attendance and exceeds five academic years before re-admittance to a degree program at OSU. Prior to applying for academic fresh start student must, after re-enrolling in the university, have successfully completed a minimum of 24 letter-graded units over two consecutive terms, and earned a grade-point average of at least 2.5 in these terms. The student must also provide a signed letter of recommendation from a current OSU college dean, school director, or department or program chair/head. It may be seconded by the college head advisor or a current faculty member within the discipline the student is currently engaged to complete advocating on the student's behalf for academic fresh start.

Effect of the academic fresh start:

- Upon meeting all of the conditions of qualification, the student may select from one to three contiguous academic terms from previous enrollment at OSU for the application of academic fresh start.
- The grades¹ from all courses taken during the terms that are proposed for academic fresh start will be excluded from meeting institutional requirements and the calculation of institutional units and grade-point average.
- All grades representing the student's academic history at OSU will appear on the student's academic record (transcript), but all academic fresh start approved courses will be coded as "excluded" similar to a repeated course. Additionally, a comment of "Academic Fresh Start" will be appended to each term that qualifies under academic fresh start.
- All courses excluded under academic fresh start, will also be excluded from the calculation of course repeats defined by AR 20.

Footnote:

¹ Valid grades include outstanding I (Incomplete) grades that have not been resolved.

CATALOG YEAR POLICY

Graduation Requirements/Catalog Contract Policy

When determining the graduation requirements for a given student:

- Students must meet all applicable degree requirements from the published catalog(s).
- The student's catalog year for institutional and baccalaureate core requirements is established by his or her first term of attendance (matriculation date) at Oregon State University as an admitted student.
- The student's catalog year for college/major/option/minor requirements is based on the date of declaration of the major/option/minor; consequently, a student's first (primary) major/option must be in the same catalog year. If a primary option is declared in a subsequent academic year, the primary option will be aligned with the catalog year of the primary major. If the primary option did not exist in the catalog year of the primary major, the primary major will roll forward to the catalog year of the primary option.
- Additionally, while the student's first major/option must be in the same catalog year, any additional declarations of majors/options/minors will be determined by the declaration dates (and corresponding catalog years) established by the change of academic program process. A student, in collaboration with an advisor, can also choose to graduate under a subsequent (to their most recent major declaration date) catalog year within the same major/option.
- At the time of graduation, all students, including transfer students, must use a catalog that is not more than ten years old. Students may petition to the head advisor of their college for an extension of a catalog greater than ten years prior to their expected graduation term.
- Current OUS policy requires a student to reapply after not enrolling at OSU for four consecutive terms (not including summer terms); the published catalog for the resulting readmission/matriculation date will become the catalog of record for graduation requirements. The Planned Educational Leave Program defined in AR 13.d beginning with 2011-2012 academic year, provides a mechanism for a student to sustain their original catalog of record during a planned absence.
- For Degree Partnership Program students, the first term the student is admitted to OSU will be the matriculation date and will determine the catalog year for

institutional and baccalaureate core requirements. The catalog year for college/major/option/minor requirements will be the same as all other OSU students.

- Every effort has been made to ensure the accuracy of information in the OSU General Catalog. However, Oregon State University or the Oregon State Board of Higher Education may find it necessary from time to time to make changes in courses, curricula, or degree requirements. Students already admitted to a program in which such changes have been made will be reasonably accommodated, if possible, to ensure their normal progress toward a degree. A student may, however, still be required to conform to changes in courses, curricula, or degree requirements as deemed necessary by Oregon State University or the State Board of Higher Education.

GRADING SYSTEM

Grades

The grading system consists of:

- A = Exceptional, 4.0 grade points per credit.
- A- = 3.7 grade points per credit.
- B+ = 3.3 grade points per credit.
- B = Superior, 3.0 grade points per credit.
- B- = 2.7 grade points per credit.
- C+ = 2.3 grade points per credit.
- C = Average, 2.0 grade points per credit.
- C- = 1.7 grade points per credit.
- D+ = 1.3 grade points per credit.
- D = Inferior, 1.0 grade point per credit.
- D- = 0.7 grade point per credit.
- F = Failure, 0.0 grade point per credit.
- G = Reserved for Graduate Credit, no grade point per credit.
- I/Alt Grade = Incomplete, no grade points or credits. If not resolved after 12 months or degree conferral, the "I" reverts to the alternate grade.
- N = No credit, no grade point per credit.
- NG = No basis for a grade, no credit or grade points.
- P = Pass, credit given, no grade points.
- R = Thesis in Progress, credit given, no grade points.
- S = Satisfactory, credit given, no grade points.
- TR = Accepted Transfer Credit.
- U = Unsatisfactory, no credit or grade points.
- W = Withdrawal (passing), no credit or grade points.
- WC = Complete withdrawal, no credit or grade points.
- Y = Grade yet to be determined, no

credit or grade points.

- AUD = Audit, no credit or grade points.
- WAU = Withdrawal from Audit, no credit or grade points.

When a requirement of a course has not been completed for reasons acceptable to the instructor and the rest of the academic work is passing, a report of I (incomplete) may be made and additional time granted. The I is only granted at the discretion of the instructor. The instructor must submit the grade the student will earn if the missing work is not completed. That alternate grade will become the default grade if the missing work is not completed. The instructor documents the deficiency and the deadline for completing the missing work. A record of the deficiency shall be kept on file in the unit or department office. The allotted time awarded shall not exceed one calendar year except by *petition** or the time of the degree conferral, whichever comes first. To remove the I grade, the student must complete the deficiency within the allotted time and the instructor will then submit the appropriate grade. If the student fails to complete the work within the allotted time, the Registrar's Office will automatically change the I grade on the student's record to the alternate grade submitted by the instructor at the time the I was given. The alternate grade will be included in the grade-point average. Under no circumstances shall a student who earns an A-F grade or an N or U grade have his or her grade changed retroactively to an I grade.

An instructor may move to correct a grade by filing a Change of Grade in the Registrar's Office. Grade changes for students of a permanently separated instructor will be managed by the department chair of the course involved. Upon permanent separation from the University an instructor's change of grade will not be accepted by the Office of the Registrar. The Office of the Registrar will routinely review grade changes.

**A student may petition via the Office of the Registrar for an extension of the one calendar year deadline with the concurrence of the faculty. An approved petition will grant an extension of a single additional term, with a maximum of three total extensions being possible. An approved petition for an extension of time to remove an incomplete will be voided at the time of degree conferral.*

Students may withdraw from a course. In such cases, a grade of W is assigned. A student who discontinues attendance in a course without official withdrawal receives a grade of F in the course.

GRADE POINTS

Grade points are computed on the basis of 4 points for each credit of A grade, 3.70 for each credit of A- grade, 3.30 for

each credit of B+ grade, 3.00 for each credit of B grade, 2.70 for each credit of B- grade, 2.30 for each credit of C+ grade, 2.00 for each credit of C grade, 1.70 for each credit of C- grade, 1.30 for each credit of D+ grade, 1.00 for each credit of D grade, .70 for each credit of D- grade, and 0 for each credit of F.

Marks of I/Alt, W, WC, P, N, NG, R, S, and U are disregarded in the computation of points. The grade-point average (GPA) is the quotient of total points divided by total credits; total credits are the number of term credits in which grades A, B, C, D, and F are received.

ACADEMIC STANDING

Satisfactory Academic Standing (Undergraduate students) (AR 22)

Oregon State University expects students to maintain satisfactory academic progress toward degree completion. At the conclusion of each term, grade-point averages are calculated and academic standings determined for students seeking a baccalaureate degree according to the criteria outlined below. Students whose standings evidence a lack of satisfactory progress will be warned of this condition and advised to seek help from their academic advisors.

- a. **Academic Warning:** Students with a term GPA below 2.0 will be placed on Academic Warning.
- b. **Academic Probation:** Students who have attempted¹ 24 or more credits at OSU and have an OSU cumulative GPA below 2.0 will be placed on Academic Probation. Students who attain a cumulative GPA of 2.0 or better are removed from Academic Probation.
- c. **Academic Suspension:** Students who are on Academic Probation and have a subsequent term GPA below 2.0 will be placed on Academic Suspension. Academic Suspension is recorded on the student's academic record. Students who are academically suspended are denied all the privileges of the institution and of all organizations in any way connected to it, including any university-recognized living group.
- d. **Reinstatement to the University:** Suspended students will be considered for reinstatement to the university after two years or completion of a minimum of 24 quarter credits of transferable college-level work at an accredited college or university, with a GPA of 2.5 or above.

The Faculty Senate Committee on Academic Standing is charged with the responsibility for enforcement of the above regulations on Satisfactory Academic Standing. Additionally, this commit-

tee has discretionary authority to grant exceptions and to develop guidelines for the administration of these regulations.

Footnote:

¹ An attempt comprises a final grade in a course where the grade is: A, A-, B+, B, B-, C+, C, C-, D+, D, D-, F, S, U, P, NP, I/Alternate Grade (where the Alternate Grade is one of these grades), W, or Y.

Attendance

An instructor has the privilege of considering class participation in arriving at a student's grade, but it is not intended that attendance in and of itself normally be a factor in measuring a student's academic accomplishment in a course.

Other Limitations

Academic performance is not the sole criterion for admission to and continuation in certain courses and programs at the university, such as practicum courses and internships. The university may find it necessary to evaluate a person's background to determine his or her likelihood of maintaining standards of professional conduct that are necessary in the academic discipline or profession. An evaluation may take into consideration current performance, as well as past experiences and actions that could affect a student's ability to perform in the particular course or program.

STUDENT CONDUCT REGULATIONS

Oregon State University aspires to stimulate a lasting attitude of civility, social responsibility and openness in our students as well as an appreciation for our values of accountability, diversity, respect, and truth. Consistent with that, all students enrolled at OSU are expected to follow student conduct regulations and university policies that have been developed to govern behavior of students as well as members of the university community. These regulations and policies are formulated to guarantee each student's freedom to learn and to protect the fundamental rights of others. The assumption upon which these regulations are based is that all people must treat others with dignity and respect in order for scholarship to thrive. The regulations and procedures for disciplinary action and appeal are available on the OSU website, <http://oregonstate.edu/studentconduct/home/>. Violations of the regulations subject a student to appropriate disciplinary or judicial action. These regulations have been formulated by the Student Conduct Committee, the Student Activities Committee, the university administration, and the State Board of Higher Education.

STUDENT RECORDS

Family Educational Rights and Privacy Act of 1974, as amended, (20 U.S.C. 1232g) provides that Oregon State University students have the right to inspect and review the student's education records within 45 days of the day the university receives a request for access; the right to request the amendment of the student's education record that the student believes are inaccurate or misleading; the right to consent to disclosures of the personally identifiable information contained in the student's educational record, except to the extent that FERPA authorizes disclosure without consent; and the right to file a complaint with the U.S. Department of Education concerning alleged failures by Oregon State University to comply with the requirements of FERPA. The Student Records Policy is available in the printed and electronic *Registration Information Handbook* and *OSU General Catalog*.

RELEASE OF STUDENT INFORMATION TO MILITARY RECRUITERS (SOLOMON AMENDMENT)

Oregon State University provides information about students that is requested by military recruiters under requirements of the Solomon Amendment (As of Oct. 23, 1998 [63 Fed. Reg. 56819] and the Interim Rule published Jan. 13, 2000 [65 Fed. Reg. 2056] by Department of Defense). Under this federal law military recruiters may request the following information: Name, current mailing address (as provided by the student) including email address, current telephone number (as provided by the student), age, class level (e.g. freshman, sophomore, etc.), and academic major. The information may be requested for the immediately previous term, current term, or future term for all students age 17 and older who are or were registered at OSU for at least 1 credit in the requested term. Recruiters may request this information each term. Recruiters may not obtain any information that is not in the above list of student recruiting information. For example, they may not request any of the following: Social Security Number or ID Number, place of birth, race/ethnicity/nationality, grades and GPA, grades of low-performing students, religious affiliation, names of students with loans in default, veteran status, or names of students no longer enrolled at OSU. Institutions that do not comply with the Solomon Amendment risk losing federal funding from the departments of Defense, Education, Health and Human Services, Labor, and Transportation. Institutions do not risk losing student-aid funding such as Perkins Loans, Federal SEOG or Work-Study funds.

PROGRESS STANDARDS FOR VETERAN STUDENTS

Programs at Oregon State University are approved for the use of VA benefits under the Montgomery GI Bill, Dependents Educational Assistance, and Title 38 and Title 10 of the US Code, or benefits offered by the State of Oregon Department of Veteran Affairs. The university, through the Registrar's Office, provides the certifying service to qualified students. The certifying official issues enrollment certification documents to the appropriate VA regional office and monitors students' satisfactory progress for the VA. Students wishing veterans counseling or other services must address the Veterans Administration directly.

1. OSU students who receive benefits from the Veterans Benefits Administration of the Department of Veteran Affairs are subject to the satisfactory progress standards as set forth in Chapter 38, U.S. Code sections 1674, 1724, 1775, and 1776, and to those defined by the university in **Academic Regulation 22, Satisfactory Academic Standing**: Oregon State University expects students to maintain satisfactory academic progress toward degree completion. At the conclusion of each term, grade-point averages are calculated and academic standings determined for students seeking a baccalaureate degree according to the criteria outlined below. Students whose standings evidence a lack of satisfactory progress will be warned of this condition and advised to seek help from their academic advisors.
 - a. **Academic Warning:** Students with a term GPA below 2.0 will be placed on Academic Warning.
 - b. **Academic Probation:** Students who have attempted¹ 24 or more credits at OSU and have an OSU cumulative GPA below 2.0 will be placed on Academic Probation. Students who attain a cumulative GPA of 2.0 or better are removed from Academic Probation.
 - c. **Academic Suspension:** Students who are on Academic Probation and have a subsequent term GPA below 2.0 will be placed on Academic Suspension. Academic Suspension is recorded on the student's academic record. Students who are academically suspended are denied all the privileges of the institution and of all organizations in any way connected to it, including any university-recognized living group.
 - d. **Reinstatement to the University:** Suspended students will be considered for

reinstatement to the university after two years or completion of a minimum of 24 quarter credits of transferable college-level work at an accredited college or university, with a GPA of 2.5 or above.

2. Students, who are placed on probation by the university, also will be notified that they are on probation insofar as Veterans Affairs' progress standards are concerned. If a student's deficiency is not corrected and they subsequently are placed on academic suspension, the university will notify Veterans Affairs of his or her unsatisfactory progress.
3. The university will recertify students who are suspended by the university and subsequently reinstated by the Academic Standing Committee.
4. Students dismissed from the university for unsatisfactory conduct will be reported as making unsatisfactory progress. The university will recertify the student only upon rescission of the dismissal by the university.

VETERAN RESOURCES COORDINATOR

The Veteran Resources Coordinator (VRC) helps veterans and eligible dependents at Oregon State University find, utilize, and in some cases apply for applicable state and federal VA education benefits. In addition to helping with educational benefits, the VRC can also help veterans and their dependents tap into other non-education related VA benefits (e.g. disability compensation, VA Medical, Employment, and Homeless Veterans Reintegration Programs). In addition, the VRC can provide information to active duty military personnel on benefits they can access while in the service that will have a positive impact on their transition into civilian life down the road (e.g. Vet Centers, VA Medical Facilities, Tricare/ Triwest questions, the VA claims process, etc).

Contact Veteran Services Advisor Gus Bedwell at gus.bedwell@oregonstate.edu.

VA CERTIFYING OFFICIAL

The VA Certifying Official (VACO) certifies the enrollment of veterans and eligible dependents at Oregon State University. All veterans and eligible dependents, whether new, returning, or transfer students, who expect to receive educational benefits from the Veterans Administration must notify the VACO in the Registrar's Office. For questions about benefits, contact veterans@oregonstate.edu.

The VA Certifying Official also monitors and reports to the Veterans Administration the Satisfactory Progress Standards for students who are receiv-

ing VA education benefits. See Progress Standards for Veteran Students for more information.

VETERANS TUITION ASSISTANCE PROGRAM

The Veterans Affairs Certifying Officials (VACO) at Oregon State University are the direct contact points for students using the Veterans Tuition Assistance Program. VACOs process students' tuition assistance authorizations and contracts and forward copies to OSU Business Affairs for billing the military branches. Depending on the branch of the military, requirements vary on how grades are reported. Grade reporting is done at the end of each academic term.

For questions about the Veterans Tuition Assistance Program, contact veterans@oregonstate.edu.

STATE EDUCATION AID

The state of Oregon has an educational aid program available to Oregon veterans who meet eligibility requirements. The state benefit may not be received for training for benefits which the veteran currently is receiving under the federal GI Bill and Voc Rehab. Information about the Oregon aid program may be obtained from the Department of Veterans Affairs, Education Section, 700 Summer St., NE, Salem, OR 97301-1285, 503-373-2000 or 800-828-8801. Additional information may be obtained from the website at <http://www.oregon.gov/odva/BENEFITS>.

VETERAN AND U.S. MILITARY SERVICE RECOGNITION CORD

Recognition of U.S. Military Service
Oregon State University recognizes the significant contribution and sacrifices made by OSU students who are U.S. military service members and veterans. Students may receive a red, white, and blue Military Service Recognition Cord to be worn at commencement.

To apply for the recognition, students should complete the OSU Military Service Recognition application which is available on the OSU Veterans website at <http://oregonstate.edu/veterans/home/>. Applications are to be submitted to the Veterans Resource Coordinator who will approve the application and distribute the recognition cord.

UNDERGRADUATE PLANNED EDUCATIONAL LEAVE PROGRAM

The Undergraduate Planned Educational Leave Program (PELP) is a voluntary, temporary, planned interruption or pause in a student's regular, full-time education. Its purpose is to enhance an undergraduate student's prospect of successful completion of their academic program. The PELP provides one opportunity¹ for a student to arrange a

voluntary absence for as many as six consecutive regular academic terms (not including the summer terms). The PELP is designed to allow a student to pursue other activities that will assist them in clarifying their educational goals, such as job opportunities and experiences away from campus, military deployment, time to resolve personal or medical problems, or other similar pursuits. The PELP allows an undergraduate student to temporarily suspend their academic work for a period of time (in accordance with AR 13a, 13b, and 13c), and resume their studies with minimal procedural difficulties. The PELP \$25 non-refundable application fee allows an undergraduate student to maintain their official standing as a student at OSU and reserves the student's right to keep their original academic catalog² active during their absence. Beginning with the 2011–2012 academic year, all OSU undergraduate students³ are eligible to request leave through the PELP. The university reserves the right to consider a student's current academic standing and any existing student conduct issues prior to approving the voluntary PELP leave request. Students who withdraw from OSU prior to the 2011–2012 academic year and who are away from campus for four or more consecutive regular academic terms (not including summer terms) must re-enroll with OSU to re-establish their relationship as an OSU student and their academic catalog will be reset to the academic year they return to OSU.

Transcript Notation

A notation of the dates of any approved leave will be indicated on each student's official transcript.

Footnotes:

- ¹ Military deployments are an exception to this limitation. All military personnel who are deployed for military service may submit a voluntary leave request for each deployment.
- ² In accordance with the university's catalog policy on the inside cover of the General Catalog.
- ³ The PELP began with the 2011–2012 academic year (Summer 2011). Any former OSU students who attended OSU prior to the 2011–2012 academic year and have been absent for four or more consecutive regular academic terms will be held to OSU's prior policy that resets the academic catalog to the catalog in effect at the time they return to OSU.

College of Agricultural Sciences	Undergrad. Majors	Undergrad. Minors	Options	Certs.	Grad. Majors	Grad. Minors	Grad. Certs	MAIS	Prof. Programs	Endorsement
Agricultural Business Management	BS, HBS	X								
Agricultural Education					MAg, MS	X		X		
Agricultural Sciences	BS, CRED, HBS	X								
Agronomy			X							
Animal Management			X							
Animal Reproduction and Development			X							
Animal Science					MAg, MS, PhD	X		X		
Animal Sciences	BS, CRED, HBS	X								
Applied Economics					MA, MS, PhD	X		X		
Applied Genetics			X							
Applied Systematics in Botany					PSM					
Bioenergy		X	X							
Bioproducts			X							
Bioresource Research	BS, CRED, HBS									
Biotechnology			X							
Botanical Research			X							
Botany	BS, CRED, HBS	X								
Botany and Plant Pathology					MA, MAg, MS, PhD	X		X		
Climate and Biosystems Modeling			X							
Crop and Soil Science	BS, CRED, HBS									
Crop Science		X			MAg, MS, PhD	X		X		
Ecological and Sustainable Horticultural Production			X							
Ecological Landscape and Urban Forestry			X							
Enology and Viticulture			X							
Entomology		X	X Grad.		MA, MAg, MS, PhD	X				
Environmental Chemistry			X							
Environmental Economics			X							
Environmental Economics and Policy	BS, HBS									
Environmental Policy			X							
Fermentation Science		X	X							
Fisheries and Wildlife Administration					PSM					
Fisheries and Wildlife Sciences	BS, HBS	X								
Fisheries Management							X			
Fisheries Science					MAg, MS, PhD	X		X		
Food Quality			X							
Food Science		X	X							
Food Science and Technology	BS, CRED, HBS				MAg, MS, PhD	X				
Food Technology		X								
Fungal Biology			X							
General Horticulture			X							
General Option			X							
Genomics/Bioinformatics			X							
Horticultural Research			X							
Horticulture	BS, CRED, HBS	X			MAg, MS, PhD	X		X		
International Agricultural Development		X				X				

College of Agricultural Sciences	Undergrad. Majors	Undergrad. Minors	Options	Certs.	Grad. Majors	Grad. Minors	Grad. Certs	MAIS	Prof. Programs	Endorsement
International Studies	BA, HBA									
Leadership		X								
Master of Agriculture					MAg					
Natural Resource and Environmental Law and Policy		X								
Pest Biology and Management			X							
Plant Breeding and Genetics			X							
Plant Breeding and Genetics			X Grad.							
Plant Ecology and Systematics			X							
Plant Growth and Development			X							
Plant Molecular Genetics and Biotechnology			X							
Pre-Professional Teaching Botany			X							
Pre-Veterinary Medicine/Science			X							
Rangeland Ecology and Management		X			MAg, MS, PhD	X		X		
Rangeland Sciences	BS, CRED, HBS									
Resource Economics		X								
Rural Studies						X				
Soil Science		X	X		MAg, MS, PhD	X		X		
Sustainability	BS, HBS									
Sustainable Ecosystems			X							
Therapeutic Horticulture			X							
Toxicology		X	X		MAg, MS, PhD	X				
Turf and Landscape Management		X								
Turf Management			X							
Viticulture and Enology			X							
Water Resources			X							
Wildlife Science					MAg, MS, PhD	X		X		
College of Business	Undergrad. Majors	Undergrad. Minors	Options	Certs.	Grad. Majors	Grad. Minors	Grad. Certs	MAIS	Prof. Programs	Endor.
Accountancy	BS, CRED, HBS									
Accounting			Undergrad. Grad.							
Accounting Information Systems			X							
Apparel Design	BS, CRED, HBS									
Business Administration	BA, BS, CRED, HBA, HBS				MBA, PhD	X				
Business Administration and Accountancy					MBAA					
Business and Entrepreneurship		X								
Business Information Systems	BA, BS, CRED, HBA, HBS									
Commercialization (Pending)			X Grad							
Design and Human Environment					MA, MS, PhD	X				
Entrepreneurship for Business Majors			X							
Executive Leadership (Pending)			X Grad							
Finance	BA, BS, CRED, HBA, HBS									
General Business			X							
Global Operations (Pending)			X Grad							
Graphic Design	BFA, HBFA									
Hospitality Management			X							
Housing Studies			X							

College of Business	Undergrad. Majors	Undergrad. Minors	Options	Certs.	Grad. Majors	Grad. Minors	Grad. Certs	MAIS	Prof. Programs	Endor.
Innovation Management	BA, BS, HBA, HBS									
Innovation/Commercialization			X Grad.							
Interior Design			X							
Interior Design	BS, CRED, HBS									
International Business			X							
International Studies	BA, HBA									
Management	BA, BS, CRED, HBA, HBS									
Marketing	BA, BS, CRED, HBA, HBS		X Grad							
Merchandising Management	BS, CRED, HBS	X								
Renewable Energy (Pending)			X Grad							
Sustainability	BS, HBS									
Wealth Management			X Grad							
College of Earth, Ocean, and Atmospheric Sciences	Undergrad. Majors	Undergrad. Minors	Options	Certs.	Grad. Majors	Grad. Minors	Grad. Certs	MAIS	Prof. Programs	Endor.
Applied Ecology and Resource Management			X							
Aquatic Biology			X							
Earth Sciences	BS, CRED, HBS									
Earth Systems			X							
Environmental Chemistry for the Environmental Sciences			X							
Environmental Conservation and Sustainability			X							
Environmental Geosciences		X								
Environmental Policy			X							
Environmental Sciences	BS, CRED, HBS									
Environmental Sciences		X								
Geographic Information Science				X			X			
Geography		X	X		MA, MS, PhD	X		X		
Geology		X	X		MA, MS, PhD	X		X		
International Studies	BA, HBA									
Land-Air Interaction			X							
Marine Resource Management					MA, MS	X	X			
Ocean Science			X							
Ocean, Earth and Atmospheric Sciences					MA, MS, PhD	X		X		
Oceanography		X								
Pre-Education Environmental Science			X							
Sustainability	BS, HBS									
Terrestrial Ecosystems			X							
Water Conflict Management and Transformation						X	X			
Water Science and Resources			X							
College of Education	Undergrad. Majors	Undergrad. Minors	Options	Certs.	Grad. Majors	Grad. Minors	Grad. Certs	MAIS	Prof. Programs	Endor.
Adult Education					EDM	X		X		
Advanced Mathematics										X
Agricultural Science and Technology										X
Biology Education										X
Chemistry Education										X
Clinical Mental Health Counseling			X Grad							

College of Forestry	Undergrad. Majors	Undergrad. Minors	Options	Certs.	Grad. Majors	Grad. Minors	Grad. Certs	MAIS	Prof. Programs	Endor.
Forest Management			X							
Forest Operations Management			X							
Forest Resources			X							
Forestry	BS, HBS	X								
Geosciences and Natural Resource			X							
Human Dimensions in Natural Resources			X							
Individualized Specialty (NR)			X							
Individualized Specialty (RRM)			X							
International Ecotourism			X							
International Studies	BA, HBA									
Law Enforcement			X							
Law Enforcement Natural Resources			X							
Management and Marketing			X							
Native Americans and Natural Resources			X							
Natural Resource Education			X							
Natural Resource Policy and Management			X							
Natural Resources	BS, CRED, HBS	X			MNR					
Natural Resources Conservation and Technology			X							
Park Landscapes			X							
Public Policy			X							
Recreation and Tourism Management			X							
Recreation Management			X							
Recreation Resource Management	BS, CRED, HBS	X								
Renewable Materials	BS, CRED, HBS	X								
Resource Conservation			X							
Resource Planning			X							
Science and Engineering			X							
Sociology			X							
Soil Resources			X							
Sustainability	BS, HBS									
Sustainable Agroforestry			X							
Sustainable Forest Management					MF, MS, PhD			X		
Sustainable Natural Resources							X			
Tourism			X							
Tourism and Outdoor Leadership	BS, CRED	X								
Urban Forest Landscapes			X							
Watershed Management			X							
Wildland Fire Ecology			X							
Wood Science					MS, PhD	X		X		
College of Liberal Arts	Undergrad. Majors	Undergrad. Minors	Options	Certs.	Grad. Majors	Grad. Minors	Grad. Certs	MAIS	Prof. Programs	Endor.
20th Century Studies				X						
American Studies	BA, BS, CRED, HBA, HBS									
Anthropology	BA, BS, CRED, HBA, HBS	X				X				
Applied Anthropology					MA, PhD	X		X		

College of Liberal Arts	Undergrad. Majors	Undergrad. Minors	Options	Certs.	Grad. Majors	Grad. Minors	Grad. Certs	MAIS	Prof. Programs	Endor.
Applied Ethics				X	MA	X		X		
Applied Visual Arts	BFA, CRED, HBFA									
Archaeology/Physical Anthropology			X							
Art	BA, BS, CRED, HBA, HBS					X				
Art History		X	X							
Asian Languages and Cultures		X								
Asian Studies		X								
Biocultural Option			X							
Communication		X	X							
Community Development and Leadership			X							
Contemporary Hispanic Studies					MA	X				
Creative Writing					MFA	X				
Crime and Justice			X							
Cultural Anthropology			X							
Digital Communication Arts	BA, BFA, BS, CRED, HBA, HBFA, HBS									
Economics	BA, BS, CRED, HBA, HBS	X								
English	BA, CRED, HBA	X			MA	X		X		
Environmental and Natural Resource Sociology			X							
Environmental Politics and Policy			X							
Ethnic Studies	BA, BS, CRED, HBA, HBS	X				X				
Film Studies		X								
Fine Arts			X							
Fine Arts BFA			X							
Food in Culture and Social Justice				X		X				
Foreign Languages and Literatures						X				
French	BA, CRED, HBA	X								
General Anthropology			X							
German	BA, CRED, HBA	X								
History	BA, CRED, HBA	X				X				
History of Science					MA, MS, PhD	X		X		
Instrumental Performance			X							
International Affairs			X							
International Studies	BA, HBA									
Language in Culture				X						
Latin American Affairs				X						
Law, Economics and Policy			X							
Law, Politics and Society			X							
Liberal Studies	BA, BS, CRED, HBA, HBS									
Managerial Economics			X							
Mathematical Economics			X							
Medical Humanities				X						
Multimedia		X								
Music	BA, BS, CRED, HBA, HBS	X				X				
Music Education			X							

College of Liberal Arts	Undergrad. Majors	Undergrad. Minors	Options	Certs.	Grad. Majors	Grad. Minors	Grad. Certs	MAIS	Prof. Programs	Endor.
Music Production			X							
New Media Communications		X								
Peace Studies				X						
Philosophy	BA, BS, CRED, HBA, HBS	X				X				
Photography		X	X							
Photography BFA			X							
Piano Performance			X							
Political Science	BA, BS, CRED, HBA, HBS	X				X				
Popular Music Studies		X								
Pre-Education			X							
Psychology	BA, BS, CRED, HBA, HBS	X				X				
Public Policy					MPP, PhD					
Queer Studies		X				X				
Religion and Culture				X						
Russian		X								
Russian Studies				X						
Social Science	BA, BS, CRED, HBA									
Sociology	BA, BS, CRED, HBA, HBS	X				X				
Spanish	BA, CRED, HBA	X								
Speech Communication	BA, BS, CRED, HBA, HBS					X				
Sustainability	BS, HBS									
Theater Arts		X	X							
Visual Arts		X								
Vocal Performance			X							
Women, Gender, and Sexuality Studies	BA, BS, CRED, HBA, HBS	X		X	MA	X		X		
Writing		X								
College of Pharmacy	Undergrad. Majors	Undergrad. Minors	Options	Certs.	Grad. Majors	Grad. Minors	Grad. Certs	MAIS	Prof. Programs	Endor.
Pharmacy					MS, PhD	X				
Pharmacy, Doctor of Pharmacy (4-year)					D PHAR				X	
College of Public Health and Human Sciences	Undergrad. Majors	Undergrad. Minors	Options	Certs.	Grad. Majors	Grad. Minors	Grad. Certs	MAIS	Prof. Programs	Endor.
Aging Sciences						X				
Applied Exercise and Sport Science			X							
Athletic Training	BS, CRED, HBS									
Child Development			X							
Community Health						X				
Dietetics			X							
Early Childhood Development and Education		X								
Environmental Safety and Health		X								
Exercise and Sport Science	BS, CRED, HBS				MS, PhD	X		X		
Exercise Physiology		X								
Fitness and Nutrition			X							
Gerontology				X		X				
Health Management and Policy		X	X				X			
Health Promotion and Health Behavior			X							

College of Public Health and Human Sciences	Undergrad. Majors	Undergrad. Minors	Options	Certs.	Grad. Majors	Grad. Minors	Grad. Certs	MAIS	Prof. Programs	Endor.
Human Development and Family Science, General			X							
Human Development and Family Sciences	BS, CRED, HBS									
Human Development and Family Studies					MS, PhD	X		X		
Human Services			X							
International Studies	BA, HBA									
Nutrition	BS, CRED, HBS	X			MS, PhD	X		X		
Nutrition and Foodservice Systems			X							
Nutrition and Health Sciences			X							
Physical Education Teacher Education			X							
Pre-Dietetics			X							
Pre-Therapy and Allied Health			X							
Public Health	BS, CRED, HBS	X			MPH, PhD	X	X			
Sports Injury Care		X								
Sustainability	BS, HBS									
College of Science	Undergrad. Majors	Undergrad. Minors	Options	Certs.	Grad. Majors	Grad. Minors	Grad. Certs	MAIS	Prof. Programs	Endor.
Actuarial Science		X								
Advanced Biochemistry			X							
Advanced Chemistry			X							
Applied Physics			X		MS, PSM					
Biochemistry			X							
Biochemistry and Biophysics	BS, HBS				MA, MS, PhD	X		X		
Biology	BS, HBS	X								
Biophysics			X							
Biotechnology (Biology)			X							
Business			X							
Chemical Engineering			X							
Chemical Physics			X							
Chemistry	BA, BS, CRED, HBA, HBS	X			MA, MS, PhD	X				
Chemistry Education			X							
Computational Physics			X							
Environmental Chemistry			X							
Forensic Science			X							
General Science	BS, CRED, HBS									
Genetics			X							
Geophysics			X							
International Studies	BA, HBA									
Management for Science Professionals							X			
Marine Biology			X							
Materials Science			X							
Mathematical Physics			X							
Mathematics	BS, CRED, HBS	X			MA, MS, PhD	X		X		
Microbiology	BS, HBS	X			MA, MS, PhD	X				
Optical Physics			X							
Physics	BA, BS, CRED, HBA, HBS	X			MA, MS, PhD	X		X		

PRE-PROFESSIONAL HEALTH PROGRAMS (Options under majors)
Pre-Clinical Laboratory Science (General Science major)
Pre-Dentistry (General Science major)
Pre-Education (General Science major)
Pre-Medicine (Chemistry major and General Science major)
Pre-Nursing Education (General Science major)
Pre-Occupational Therapy (General Science major)
Pre-Optometry (General Science major)
Pre-Pharmacy (General Science major)
Pre-Physical Therapy (General Science major)
Pre-Physician Assistant (General Science major)
Pre-Podiatry (General Science major)
Pre-Veterinary Medicine (General Science major)
Pre-Veterinary Medicine/Science (Animal Science major)

STANDARD TEACHING LICENSURE FOR IN-SERVICE TEACHERS IS OFFERED IN THE FOLLOWING AREAS:	
Teaching: Advanced Mathematics Education	MAT
Teaching: Agricultural Education	MAT
Teaching: Biology Education	MAT
Teaching: Chemistry Education	MAT
Teaching: Elementary Education	MAT
Teaching: Family and Consumer Sciences Education	MAT
Teaching: Integrated Science Education	MAT
Teaching: Music Education	MAT
Teaching: Physics Education	MAT
Teaching: Spanish Education	MAT

TUITION AND FEE SCHEDULE (PER TERM) FOR 2014-2015

For a full listing of tuition and fees, please visit OSU Business Affairs at <http://oregonstate.edu/fa/businessaffairs/student/tuition-and-fees>.

MANDATORY ENROLLMENT FEES

Students paying mandatory enrollment fees are entitled to services maintained by OSU for the benefit of students. These services include use of the library; use of laboratory equipment and materials; medical attention and advice at the Student Health Center; use of gymnasium equipment; the student newspaper; admission to some athletic events; admission to concerts and lectures; and registration. No reduction in fees is made to students who may not wish to use these privileges. Employees paying staff fees are entitled to instructional and library privileges only.

Matriculation Fee: \$350.00

All new students (except non-degree seeking) are charged a one-time fee of \$350.00 at the start of their first term at OSU. This fee provides access to a variety of OSU programs and services at no additional charge. Programs and services included in the fee include, but are not limited to, open house programs, START, CONNECT, pre-enrollment advising, course drop/add/withdrawal, and official transcripts.

Advance Tuition Deposit: \$200.00

New undergraduate students will be requested to submit a tuition deposit of \$200.00 after being admitted to the university. This deposit is the indication of a student's intent to enroll at OSU.

- **Fall Term only:** Payment for your Advance Tuition Deposit is required to participate in the START program, which allows students to register for fall term classes. After May 1 the deposit is nonrefundable.

Other Fees

(Subject to change without notice.)

GRADUATE RESEARCH ASSISTANT TUITION AND FEES

See Mandatory Fees on the OSU Business Office website (http://oregonstate.edu/fa/businessaffairs/studentfinance/tuition/tuition_info). Click on Tuition/Fee Information then click on "Corvallis Campus Tuition/Fees" for the desired year. This opens a PDF within which you scroll down to the information for Oregon State University-Corvallis Campus Graduate Students.

PHARMACY TUITION AND FEES

See **Mandatory Fees** on the OSU Business Office website (http://oregonstate.edu/fa/businessaffairs/studentfinance/tuition/tuition_info). Click on Tuition/

Fee Information then click on "Corvallis Campus Tuition/Fees" for the desired year. This opens a PDF within which you scroll down to the information for Oregon State University-Corvallis Campus Pharmacy Program.

VETERINARY MEDICINE TUITION AND FEES

See **Mandatory Fees** on the OSU Business Office website (http://oregonstate.edu/fa/businessaffairs/studentfinance/tuition/tuition_info). Click on Tuition/Fee Information then click on "Corvallis Campus Tuition/Fees" for the desired year. This opens a PDF within which you scroll down to the information for Oregon State University-Corvallis Campus Veterinary Medicine.

FOR MORE INFORMATION ABOUT TUITION AND FEES

Academic Year Fee Book rates are available on the OSU Budget website at <http://oregonstate.edu/budget/tuition-and-fees>.

STUDENT ACCOUNTS OFFICE WEBSITE

Go to <http://oregonstate.edu/fa/businessaffairs/studentfinance/>.

NONDEGREE STUDENTS

(This category is designed for students not planning to complete a degree at OSU.)

Nondegree students may only enroll in 8 or fewer credits and pay tuition/fees at resident rates based on undergraduate or graduate course level. To be eligible to use Student Health Services, you must also pay the student health fee.

If a nondegree student were to enroll in 9 or more credits they would pay tuition/fees based on the undergraduate or graduate tuition fee schedule determined by the student's status.

For more information, call Student Accounts at 541-737-3775.

FEE PAYMENT OBLIGATION

Web registration presents you with a confirmed class schedule. When you finish registering, your schedule is official. This obligates you to pay all tuition and fees for your classes. If you wish to cancel this commitment and reduce or eliminate tuition charges for the term, you must officially cancel your registration or withdraw from the university (see the Tuition/Fee Reduction and Refund Schedule at http://oregonstate.edu/fa/businessaffairs/studentfinance/tuition/tuition_info). Click on Tuition/Fee Information then "Tuition Reduction Schedule."

Electronic billing statements are processed around the 5th of each month. Notification that your statement is ready will be sent to your ONID email address. It is very important that your ONID address is active and that you are

checking it regularly. You may also select to have your ONID email forwarded to an alternate address. You may view your monthly billing statements by logging onto the eBill website at <http://mybill.oregonstate.edu>. See "**eBill and eCheck**" at <http://oregonstate.edu/fa/businessaffairs/studentfinance/eBill/>.

You may pay your tuition and fees in the following ways:

OSU currently accepts eCheck, paper checks, money orders and cash as acceptable payment methods. Students can use MyOSU, <http://myosu.oregonstate.edu/>, (Paying for College, Financial Services, Pay My Bill), as a convenience option for making credit card payments. Please see the Cashier's Office Payment Information Section for more details regarding all acceptable payment methods.

Accounts are "due upon receipt" of the monthly statement, and any unpaid balance remaining after the 1st of each month is subject to an interest charge of 1 percent per month (12 percent APR).

Registration/Transcript Hold Policy

If you are enrolled for the current term, you will be allowed to register for the following term only if your account balance consists of charges only from recent academic terms—the current term and one term prior—and your overall account balance does not exceed \$2,200.00. If you are not currently enrolled, you must have your account balance paid in full in order to register.

Requests for transcripts cannot be processed until your account balance is paid in full.

DROP/WITHDRAW REFUNDS

Students who drop or withdraw from a class, or withdraw from the university may be eligible for a tuition refund. Refunds are based on assessed tuition, course fees, and mandatory fees, and are calculated from the date you officially drop, withdraw, or cancel your registration or reduce your class load, not the last date of class attendance. Please see "Registration Cancellation/Withdrawal from the University."

Refunds are processed as a credit on your account. A check will be issued to you if any credit balance remains after other charges and financial aid repayments have been satisfied. No refunds are authorized for persons paying staff rates. Allow about two weeks for processing a refund. Your refund will be sent to your current mailing address. Be sure to update your current mailing address online in MyOSU, <https://myosu.oregonstate.edu/>.

The **Tuition/Fee Reduction Schedule** below follows those policies as established by Oregon State University (there are no refunds given for persons paying staff rates):

Academic Year 2014–2015

Drop Dates	Tuition Credit	Tuition Due
Fall 2014		
October 12 or Before	100%	0%
October 13–October 19	50%	50%
October 20–October 26	25%	75%
After October 26	0%	100%
Winter 2015		
January 18 or Before	100%	0%
January 19–January 25	50%	50%
January 26–February 1	25%	75%
After Feb. 1	0%	100%
Spring 2015		
April 12 or Before	100%	0%
April 13–April 19	50%	50%
April 20–April 26	25%	75%
After April 26	0%	100%

HOW TO HANDLE AN ERROR IN BILLING

If there appears to be an error on your monthly statement, use the following guidelines:

Graduate Assistants: Errors may occur due to incorrect rate codes. Please notify your department.

Residents Billed Nonresident Rates: Pay the amount appropriate for a resident and then go to the Office of Admissions to confirm your residency status. You will be advised as to the next action to take.

Financial Aid Not Applied: If financial aid has not been applied you should verify approval of scholarships and grants at the Office of Financial Aid and Scholarships, A218 Kerr Administration Building.

Support Payments Not Applied: Verify approval for support billing at Business Affairs, B100 Kerr Administration Building.

Housing: Verify the billed amount with the University Housing and Dining Office, 102 Buxton, 541-737-4771.

Any Other Billing Amount Errors: Pay based upon the correct amount, then go to Business Affairs, B100 Kerr Administration Building for assistance.

SPECIAL FEES**Application Fee for Admission (not refundable)—**

- Undergraduate — \$60
- Graduate — \$60.00
- Nondegree-Seeking Student — \$30.00

Archiving Doctoral Thesis —

All doctoral candidates pay a minimum fee of \$25, \$80 if paying for copyright (optional), for archiving of the doctoral dissertation. See the Thesis Guide at http://oregonstate.edu/dept/grad_school/thesis.php.

Auditor's Fee—

Fee to audit a course is the same as regular fees in all classes.

Collection Fee — \$10–\$60.00

If you are enrolled Fall term 2014 and do not enroll Winter term 2015 and you leave school owing the university money and collection proceedings are initiated, you may be assessed a service charge. For balances of \$50–\$99.99, the fee is \$10; for \$100–\$499.99, the fee is \$20; for \$500 or more, the fee is \$60.

Course Fees

Certain courses have additional fees. Refer to the Schedule of Classes for individual course fees.

Diploma Mailing Fee— \$25.00 (\$40.00 out of country)

Duplicate Diploma — \$40.00
Assessed to cover the cost of special printing order and handling.

Examination for Credit—

\$80.00 per exam

Examination for Waiver—

\$80.00 per exam

FAX Service — \$20.00 per request to fax documents.**Individual Music Lesson Fee —**

Consult the Department of Music.

Late Registration Change — \$20.00 per course changed

There is no charge to change registration (add, drop, withdraw from a course, change credits, change grade option, or change to audit) by the stated deadlines. Each registration change after the stated deadlines will be charged a \$20.00 late registration fee. This applies to any late add, late add to audit, late drop, late withdrawal from a course, late change in grading basis, or late change in course credit. If you initially register after the end of the second week of the term, you will be charged a \$100.00 late registration fee, but *the \$20.00 fee is not charged when the \$100.00 late registration fee is charged*. For any registration change thereafter, however, you will be charged the \$20.00 fee.

Late Registration Fees — \$50.00 and \$100.00

A late registration fee of \$50.00 will be assessed for all initial registrations during the first two weeks of classes. For registrations approved *after* the first two weeks of classes (i.e., after the end of the late registration period) a late fee of \$100.00 will be assessed.

Library Fines and Fees

- Overdue fine for circulating books is \$0.25 per day.
- Overdue fine for Reserve Book Room material checkout:
 - Two-hour material, \$1.00 per hour.
 - Two-day material, \$2.00 per day.

Borrowers failing to return material within 42 days of the due date are charged the replacement cost of items, plus the amount of the fine (maximum

fine, \$10.00 per item). When such items are returned before the replacement has been ordered, the replacement cost will be refunded. When such items are returned after replacement items have been ordered, no refund will be made. A charge at cost, to be determined by the library, may be made for repair or replacement of damaged or mutilated library material.

PELP Fee (Undergraduate Planned Educational Leave Program) — \$25.00

Non-refundable application fee allows an undergraduate student to maintain their official standing as a student at OSU and reserves the student's right to keep their original academic catalog active during their absence.

Readmission Fee: Undergraduate — \$25.00

Required after an absence of one year. See "Eligibility to Register" in the How to Register section for details.

Readmission Fee: Graduate — \$60.00

Required after an absence of one term. See "Registration Requirements" in the Graduate School section of the catalog.

Reinstatement Fee — \$50.00

If a student's registration is canceled for failure to comply with the regulations of the institution, but is later allowed to continue work in the same term, the student must pay the reinstatement fee.

Returned Check Fee — \$25.00

If a check is returned because of any irregularity for which the student is responsible, a fine of \$25.00 will be charged.

Replacement ID Card Fee — \$25.00**Service Fee for International Programs —**

A \$325.00 per term administrative management fee will be charged for international students supported under contractual arrangement with sponsoring agencies or entities requiring special administrative or management services beyond those normally provided. This program and finance fee will be assessed for these international student programs that are administered and managed by the International Student and Faculty Services office.

Senior Citizen Fee — for special materials only

Persons 65 or older may attend class on a noncredit, space-available basis.

Special Examination Fee —

See examination for credit/waiver in the list above.

Staff Fee (except staff auditors) — 30 percent of resident undergraduate tuition

Staff members or their dependents may register for courses at 30 percent of the

per credit resident undergraduate tuition. Academic, professional, and classified employees whose appointment is equivalent to 0.50 or more may take up to 12 credits a term at this rate. Payment of the staff fee entitles the staff members to instructional and library privileges only. The fee is not refundable. The applicable course fees and resources fees are charged at 100 percent, and family members are subject to other mandatory enrollment fees. Eligibility for the staff rate must be approved by the Department of Human Resources.

If you are intending to enroll for course work at another OUS university, you must submit the staff fee privileges approval form to OSU-HR two days prior to the first day of classes.

If you are transferring the staff fee privilege to your dependent, and they are intending to enroll for course work at another OUS university, you must submit the staff fee privileges approval form to OSU-HR two weeks prior to the first day of classes.

Staff fees are nonrefundable.

Stop Payment Fee — \$15.00

Fee assessed when the payee of an OSU check requests a stop payment order.

Student ID Card Services Fee — \$20.00

Charged to all new and readmitted students their first term after admission or readmission.

Transcripts — No Fee

There is no fee for official transcripts. You can order transcripts on the Web, in person, or by mail. You can print unofficial transcripts via MyOSU, <https://myosu.oregonstate.edu/>. All financial obligations to OSU must be cleared before transcript orders are processed.

Transcripts — Rush Order Fee \$30.00

Rush order provides expedited service; the transcript is processed within two hours and sent by standard first-class mail. Rush requests for transcripts to be mailed must be received in the Registrar's Office by noon M–F in order to be mailed the same day. The rush order does **not** include express delivery.

Verification of Enrollment Fee — \$15.00 per verification

See Enrollment Verification via the Web for other options.

FINANCIAL AID

SCHOLARSHIPS, STUDENT LOANS, AND GRANTS

Approved scholarships, student loans, and grant awards will be applied automatically to registered students' accounts. You can monitor your account via Online Services and MyOSU, to see if your financial aid has been disbursed to your account.

If financial aid amounts exceed the amount of qualifying tuition/fees expenses owed, a refund will be generated if the surplus exceeds \$1.00. Distribution of the refund can be made by direct deposit or check.

- If you would like direct deposit of your financial aid refund, complete the Direct Deposit form found through Online Services or Student Finance website at <http://oregonstate.edu/fa/businessaffairs/studentfinance/>.
- If you would like your refund as a check, your current mailing address must be up to date for all check processing. You can do this through MyOSU, <https://myosu.oregonstate.edu/>.

For full details, visit the **Business Affairs Office Website**. Click on Current Student.

Beginning the third week of the term, students eligible for refunds due to financial aid or scholarship disbursements may request a refund at the Cashier's Office or through email at refund@oregonstate.edu.

EMERGENCY LOANS

Emergency loans, not to exceed \$350.00 per term, are available to students in good financial standing, attending at least half time, and formally admitted to the university. Loans are to be repaid by the last day of the current term. Loan amounts become part of the revolving account balance, and carry interest at 1 percent per month (12 percent APR). Forms to apply for an emergency loan may be picked up in the lobby of Kerr Administration and turned in at the cashier's window for review by Student Accounts.

PAYMENT OF STUDENT FEES

Payment of Nonresident Instruction Fee (580-10-080)

1. All students classified as nonresidents shall pay a nonresident fee.
2. Refunds of the nonresident fee may be granted if the student shows that the classification previously assigned was in error, but no such refund shall be made unless the student applies and submits all supporting information for residency status prior to the last day to register for the term in which the student seeks change of status.

ENROLLMENT OF SPOUSE AND DEPENDENT CHILDREN (580-010-086)

The spouse and dependent children of regular department staff members with a full-time equivalent of at least .50 may enroll as students at resident fee rates in department institutions.

RESIDENCY REQUIREMENTS

RESIDENCY CLASSIFICATION FOR TUITION PURPOSES

In Oregon, as in all other states, tuition at publicly supported four-year universities is higher for non-resident students than for resident students. The rules used in determining residency seek to ensure that only individuals who satisfy Oregon University System residency requirements are assessed the resident fee. Those rules—Oregon Administrative Rules, Chapter 580, Division 10-Board of Higher Education—appear below.

Only duly authorized residency officers have the authority to apply and interpret these rules and procedures. No other indication or determination of residency by any other institutional office, department, program or staff represents the official institutional determination of residency.

Residency for tuition purposes is determined at the point of admission. At Oregon State University, the residency officer is a member of the Office of Admissions' management team. If a person wishes to change their residency status, a residency affidavit must be filed with the residency officer no later than the last day to register for the term in which residency is sought. This day is always the first Friday of the term.

Establishing residency for tuition purposes is much different than the rules for voting, driving and filing taxes. It is possible for an individual to qualify as a resident of Oregon for purposes of voting or obtaining an Oregon driver's license and not meet the residency requirements established by these rules. For more information, contact the Office of Admissions, 541-737-4411, and ask for the Residency Officer.

DEFINITIONS (580-010-0029)

For the purpose of OAR 580-010-0030 through 580-010-0045, the following words and phrases mean:

1. "Domicile" is a person's true, fixed, and permanent home and place of habitation. It is the place where a person intends to remain and to which the person expects to return when the person leaves without intending to establish a new domicile elsewhere. In order to establish a domicile in Oregon, a person must maintain a predominant physical presence in Oregon for 12

- consecutive months after moving to the state.
2. A “financially independent person” is a person who, at the time of application for residency status:
 - a. declares himself or herself to be financially independent;
 - b. has not been claimed as a dependent during the immediately preceding tax year, and will not be claimed as a dependent during the current tax year, on the federal or state income tax returns of any other person; and
 - c. has not received in the immediately preceding calendar year, and will not receive during the current calendar year, one-half or more of his or her support, in cash or in kind, from another person or persons, except for support received from his or her spouse.
 3. A “financially dependent person” is a person who, at the time of application for residency status:
 - a. declares himself or herself to be financially dependent; and
 - b. has been claimed as a dependent on the federal and state income tax returns of another person during the immediately preceding tax year.
 3. A student may be considered primarily engaged in educational activities regardless of the number of hours for which the student is enrolled. However, a student who is enrolled for more than 8 hours in any semester or quarter during the 12-month period referred to in section (2) of this rule shall be presumed to be in Oregon for primarily educational purposes. Such period of enrollment shall not be counted toward the establishment of a bona fide domicile of 12 consecutive months in this state unless the student proves, in fact, establishment of a bona fide domicile in this state primarily for purposes other than educational.
 4. An Oregon resident is also a financially dependent person who is claimed as a dependent by another person who has both:
 - a. established and maintained an Oregon domicile as provided under OAR 580-010-0029(1) for 12 consecutive months; and
 - b. during that period, has been primarily engaged in activities other than those of being a college student.
 5. A financially dependent person who is claimed as a dependent by another person who has not established and maintained an Oregon domicile shall be presumed to be a nonresident. This presumption may be overcome by evidence of the student’s long-standing presence in Oregon and demonstration of other factors under OAR 580-010-0031.
 6. The criteria for determining Oregon resident classification shall also be used to determine whether a person who has moved from Oregon has established a non-Oregon residence.
 7. If institution records show that the residence of a student or the person upon whom the student is dependent is outside of Oregon, the student shall continue to be classified as a nonresident until entitlement to resident classification is shown. The burden of showing that the residence classification should be changed is on the student requesting the change.
 8. Notwithstanding section (4) of this rule, a student who is financially dependent on a non-Oregon resident may nonetheless be considered an Oregon resident if the student resides in Oregon for at least 12 consecutive months with a parent or legal guardian who has both:
 - a. established and maintained an Oregon domicile under OAR 580-010-0029(1) for 12 consecutive months; and
 - b. during that period, has been primarily engaged in activities other than those of being a college student

DETERMINATION OF RESIDENCE (580-010-0030)

1. For purposes of admission and instruction fee assessment, OUS institutions shall classify a student as Oregon resident or nonresident. In determining resident or nonresident classification, the primary issue is a person’s intent in coming to Oregon. Intent is inferred from a person’s conduct and history as they relate to the requirements of these residency rules. If a person is in Oregon primarily for the purpose of obtaining an education, that person will be considered a nonresident. It is possible for an individual to qualify as a resident of Oregon for purposes of voting or obtaining an Oregon driver’s license and not meet the residency requirements established by these rules.
2. An Oregon resident is a financially independent person who, prior to the term for which Oregon resident classification is requested, has both:
 - a. established and maintained a domicile in Oregon as provided under OAR 580-010-0029(1) for 12 consecutive months; and
 - b. during that period, has been primarily engaged in activities other than those of being a college student.

RESIDENCY CONSIDERATION FACTORS (580-010-0031)

1. The following factors, although not necessarily conclusive or exclusive, have probative value in support of a claim for Oregon resident classification:
 - a. Reside in Oregon for 12 consecutive months prior to the beginning of the term for which resident classification is sought and during that period be primarily engaged in activities other than those of a college student;
 - b. Reliance upon Oregon resources for financial support;
 - c. Domicile in Oregon of persons legally responsible for the student; Acceptance of an offer of permanent employment in Oregon; and
 - d. Ownership by the person of his or her living quarters in Oregon.
2. The following factors, standing alone, do not constitute sufficient evidence to effect classification as an Oregon resident:
 - a. Voting or registration to vote;
 - b. Employment in any position normally filled by a student;
 - c. The lease of living quarters;
 - d. Admission to a licensed practicing profession in Oregon;
 - e. Automobile registration;
 - f. Public records, for example, birth and marriage records, Oregon driver’s license;
 - g. Continuous presence in Oregon during periods when not enrolled in school;
 - h. Ownership of property in Oregon or the payment of Oregon income or other Oregon taxes; or
 - i. Domicile in Oregon of the student’s spouse.
3. Reliance upon non-Oregon resources for financial support is an inference of residency in another state.

EVIDENCE OF FINANCIAL DEPENDENCY (580-010-0033)

1. In determining whether a student is financially dependent, a student must provide:
 - a. Evidence of established domicile as provided under OAR 580-010-0029(1) of the person claiming the student as a dependent; and

- b. The identification of the student as a dependent on the federal and state income tax returns of the person claiming the student as a dependent. Additional documentation to substantiate dependency during the current calendar year may be required at a later time if deemed necessary by the institution.
2. A student who provides evidence that he or she is a financially dependent person under these rules shall not be required to establish a 12-month domicile prior to classification of resident status, provided such a student may not be classified as a resident while receiving financial assistance from another state or state agency for educational purposes.

RESIDENCE CLASSIFICATION OF ARMED FORCES PERSONNEL (580-010-0035)

1. For purposes of this rule, members of the armed forces means officers and enlisted personnel of:
 - a. The Army, Navy, Air Force, Marine Corps, and Coast Guard of the United States;
 - b. Reserve components of the Army, Navy, Air Force, Marine Corps, and Coast Guard of the United States;
 - c. The National Guard of the United States and the Oregon National Guard.
2. Notwithstanding OAR 580-010-0030, active members of the armed forces and their spouses and dependent children shall be considered residents for purposes of the instructional fee if the members:
 - a. Reside in this state while assigned to duty at any base, station, shore establishment, or other facility in this state;
 - b. Reside in this state while serving as members of the crew of a ship that has an Oregon port of shore establishment as its home port or permanent station; or
 - c. Reside in another state or a foreign country and file Oregon state income taxes no later than 12 months before leaving active duty.
3. An Oregon resident entering the armed forces retains Oregon residence classification until it is voluntarily relinquished.
4. An Oregon resident who has been in the armed forces and assigned on duty outside of Oregon, including a person who establishes residency under section (2)(c) of this rule, must, within a reasonable time, demonstrate an intent to retain classification as an Oregon resident.

Such intent may be shown by returning to Oregon within six months after completing service in the armed forces.

5. A person who continues to reside in Oregon after separation from the armed forces may count the time spent in the state while in the armed forces to support a claim for classification as an Oregon resident.
6. The dependent child and spouse of a person who is a resident under section (2) of this rule shall be considered an Oregon resident. "Dependent child" includes any child of a member of the armed forces who:
 - a. Is under 18 years of age and not married, otherwise emancipated or self-supporting; or
 - b. Is under 23 years of age, unmarried, enrolled in a full-time course of study in an institution of higher learning, and dependent on the member for over one-half of his/her support.

RESIDENCE CLASSIFICATION OF MEMBERS OF OREGON TRIBES (580-010-0037)

1. Students who are enrolled members of federally recognized tribes of Oregon or who are enrolled members of a Native American tribe which had traditional and customary tribal boundaries that included parts of the state of Oregon or which had ceded or reserved lands within the state of Oregon shall be assessed resident tuition regardless of their state of residence.
2. For purposes of this rule, the federally recognized tribes of **Oregon** are:
 - a. Burns Paiute Tribe;
 - b. Confederated Tribes of Coos, Lower Umpqua and Siuslaw;
 - c. Confederated Tribes of Grand Ronde Community of Oregon;
 - d. Confederated Tribes of Siletz Indians of Oregon;
 - e. Confederated Tribes of the Umatilla Indian Reservation;
 - f. Confederated Tribes of the Warm Springs Indian Reservation;
 - g. Coquille Indian Tribe;
 - h. Cow Creek Band of Umpqua Indians;
 - i. Klamath Tribes.
3. For purposes of this rule, the Native American tribes that had traditional and customary tribal boundaries that included parts of the state of Oregon or which had ceded or reserved lands within the state of Oregon are:

a. **California:**

1. Benton Paiute Tribe;
2. Big Bend Rancheria;
3. Big Lagoon Rancheria;
4. Blue Lake Rancheria;
5. Bridgeport Indian Colony;
6. Cedarville Rancheria;
7. Fort Bidwell Indian Tribe;
8. Hoopa Valley Tribe;
9. Karuk Tribe of California;
10. Likely Rancheria;
11. Lookout Rancheria;
12. Lytton Rancheria;
13. Melochundum Band of Tolowa Indians;
14. Montgomery Creek Rancheria;
15. Pit River Tribe;
16. Quartz Valley Indian Community;
17. Redding Rancheria;
18. Roaring Creek Rancheria;
19. Smith River Rancheria;
20. Susanville Rancheria;
21. Tolowa-Tututni Tribe;
22. Winnemucca Colony;
23. XL Ranch;
24. Yurok Tribe.

b. **Idaho:**

1. Nez Perce Tribe of Idaho;
2. Shoshone-Bannock Tribes.

c. **Nevada:**

1. Duck Valley Shoshone-Paiute Tribes;
2. Fallon Paiute-Shoshone Tribe;
3. Fort McDermitt Paiute-Shoshone Tribe;
4. Lovelock Paiute Tribe;
5. Pyramid Lake Paiute Tribe;
6. Reno-Sparks Indian Colony;
7. Summit Lake Paiute Tribe;
8. Walker River Paiute Tribe;
9. Winnemucca Indian Colony;
10. Yerington Paiute Tribe.

d. **Oklahoma:** Modoc Tribe of Oklahoma.

e. **Washington:**

1. Chehalis Community Council;
2. Colville Confederated Tribes;
3. Quinault Indian Nation;
4. Shoalwater Bay Tribe;
5. Yakama Indian Nation.

4. A student seeking to be assessed resident tuition under the provisions of this rule shall submit, following procedures prescribed by the OUS institution where the student seeks to enroll, a photocopy of tribal enrollment which documents tribal membership.

RESIDENCE CLASSIFICATION OF NONCITIZENS (580-010-0040)

A person who is not a citizen of the United States may be considered an Oregon resident if the person qualifies as a resident under OAR 580-010-0030 and is one of the following:

1. A lawful permanent resident. The date of approval of lawful permanent residency shall be the earliest date upon which the 12-month residency requirements under OAR 580-010-0030 may begin to accrue.
2. An immigrant granted refugee or political asylum in the United States. The date of approval of political asylum or refugee status shall be the earliest date upon which the 12-month residency requirements under OAR 580-010-0030 may begin to accrue.
3. A person holding one of the following non-immigrant visa classifications: A, E, G, H-1B, H-1C, the spouse or child of a person holding an H-1B or H-1C visa, I, K, L, NATO, O, R, S, T, TN, U, or V. The date of the issuance of a visa for one of these classifications shall be the earliest date upon which the 12-month residency requirements under OAR 580-010-0030 may begin to accrue. A person possessing a non-immigrant or temporary visa that is not identified under this rule shall not be considered an Oregon resident.

CHANGES IN RESIDENCE CLASSIFICATION (580-010-0041)

1. If an Oregon resident student enrolls in an institution outside of Oregon and later seeks to re-enroll in an OUS institution, the residence classification of that student shall be re-examined and determined on the same basis as for any other person.
2. A financially dependent student who is dependent on a person who establishes a permanent Oregon residence as defined in OAR 580-010-0030(2) during a term when the dependent student is enrolled at an OUS institution may register as a resident at the beginning of the next term.
3. Once established, classification as a resident continues so long as the student remains in continuous academic year enrollment in the classifying institution.
4. A person who seeks classification as a resident under these rules shall complete and submit a notarized Residence Information Affidavit. The affidavit and all required supportive documents and materials must be submitted by the last day to register for the term in which resident status is sought.

5. No OUS institution is bound by any determination of residency except by duly authorized officials under procedures prescribed by these rules including timely submittal of the notarized affidavit.

REVIEW OF RESIDENCE CLASSIFICATION DECISIONS BY IRC (580-010-0045)

1. An interinstitutional residency committee (IRC) is established consisting of the officers determining student residence classification at OUS institutions and a member of the Chancellor's staff appointed by the Chancellor. The member of the Chancellor's staff shall serve as chairperson. A majority of the members of the Committee shall constitute a quorum. A majority of a quorum may make decisions.
2. Residence cases of unusual complexity, especially where there may be conflict of rules, may be referred by an institution residence classification officer to the IRC for decision.
3. Any person who is aggrieved by the institution residence classification may, within ten (10) days of the date of mailing or other service of classification decision, appeal the classification to the IRC. The appeal must be in writing and shall be filed with the institution. An aggrieved person may supply written statements to the IRC for consideration in reviewing the case and may also make an oral presentation to the IRC on a date to be scheduled by the IRC. The decision of the IRC shall be final unless appealed.
4. A person dissatisfied with the IRC decision may, within ten days of the date of the mailing or other service of the IRC decision, appeal the IRC decision to the Vice Chancellor for Academic Affairs or designee. An appeal to the vice chancellor shall be in writing only. The vice chancellor's decision shall be final.
5. A person granted a meritorious hardship exception to residency under this rule prior to July 1, 1990, shall not lose the exception solely because of the repeal of the exception authorization.

RESIDENTS UNDER WICHE (580-010-0047)

A certification officer, designated by the Board, shall determine the residence classification of any person seeking certification as an Oregon resident, pursuant to the terms of the WICHE Compact. Any person dissatisfied with the decision of the certification officer may appeal to the IRC. The decision of the IRC shall be final unless further appeal is made to the Vice Chancellor for Academic Affairs pursuant to OAR 580-010-0045(4).

The Office of Financial Aid and Scholarships is here to help you invest in your future. We offer many financial aid choices for undergraduate and graduate students. It's a good idea to apply for financial aid at the same time that you apply for admission to OSU. Although we won't review your financial aid information until after your admission application is filed, you can still apply for financial aid before you have been admitted to OSU. Learn more about your options at OSU by choosing a category below so that you can start the process of applying for aid...and reaching your goals.

Financial aid is based on the premise that the student and parents are primarily responsible for providing for their education expenses and is intended to supplement student and family contributions toward educational costs. Financial aid comes from many sources, including the federal and state governments, private organizations, and Oregon State University's institutional funds. These funds consist of grants, scholarships, Federal Work-Study, subsidized loans, unsubsidized loans, and parent loans.

FINANCIAL AID AND SCHOLARSHIPS

Eligibility/Application Procedures

To be eligible for federal financial aid, a student must:

1. Fill out the Free Application for Federal Student Aid (FAFSA), **applying as soon as possible after Jan. 1** using previous year tax data (for example the 2014–2015 application will use 2013 tax information). Parents and students may estimate their income information as accurately as possible in order to complete the form and submit it by the **OSU priority deadline of February 28**. Improvements to the FAFSA application process now allow for the completion of tax information questions from the IRS directly from your return! Follow the prompts while completing the application to authorize this information exchange. Always remember that there is no fee to apply for federal aid.
2. List Oregon State University as a school that you would like your information to be sent to on the FAFSA. Oregon State's school code is **003210**.
3. **The priority FAFSA application deadline for OSU is February 28th. This date is used to determine eligibility for some need-based aid programs as well as state and institutional funds.** Applications received after the priority deadline will still be eligible for federal aid such as the Pell Grant and Direct Loans. Graduate students are not eligible for federal Title IV grants or subsidized loans.

4. Make sure you are eligible to receive financial aid. In order to receive federal funding you must:
 - Have a high school diploma or a General Education Development (GED) certificate, or complete a high school education in a home school setting that is treated as such under state law.
 - Be enrolled or accepted for enrollment in a degree or approved certificate program (e.g., not special admit)
 - Be a U.S. citizen or eligible noncitizen.
 - Have a valid Social Security Number.
 - Register with the Selective Service if required. You can register at <http://www.sss.gov>, or you can call 1-847-688-6888. (TTY users can call 1-847-688-2567.)
 - Maintain satisfactory academic progress as defined by Oregon State University once in school.
 - Are not in default on a federal student loan and do not owe money on a federal student grant.
 - The Higher Education Act of 1965 as amended (HEA) suspends aid eligibility for students who have been convicted under federal or state law of the sale or possession of drugs, if the offense occurred during a period of enrollment for which the student was receiving federal student aid (grants, loans, and/or work-study).
5. Apply for admission to Oregon State University: **Apply Online**. You will not be considered for any financial aid award until you have applied to the university.

WHAT HAPPENS AFTER I APPLY?

Once you have submitted your FAFSA application online you will receive a confirmation of receipt from the FAFSA processor. They will also send you a Student Aid Report that will give you a summary of your application and inform you of any problems you might need to resolve. You should read this report carefully and resolve problems in a timely manner. If you receive notification that something on your FAFSA is missing or incorrect, you can check Online Services Financial Aid information or contact the OSU Office of Financial Aid and Scholarships for further information.

Students whose aid application was received by the end of February may expect to receive an initial award letter by approximately April 1. Aid applications are then completed on a rolling basis by date of receipt with award notifications being sent out as files are completed.

You will receive an email or letter once your financial aid award has been completed. You will also be notified if you need to provide further information in order for us to complete your application. All cor-

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Advisor

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Advisor

respondence will be sent to your ONID account, so be sure to keep your information up to date!

The award notification will show the type and amount of aid available to you for the coming school year. To reserve these funds, the student must read and accept the award within 30 days. The accepted award indicates the student has read and agrees to the terms of the award as outlined.

You can accept, reject, or revise your Financial Aid Award through Online Services by completing the following steps:

- Log in
- Go to Financial Aid
- Go to My Award Information
- Go to Award by Aid Year
- Select the appropriate year (e.g. 2014–2015)
- Select the far right tab, Accept Award Offer
- Make your decisions about the aid that you want
- Click Submit when done
- Go to the <http://www.studentloans.gov> to complete any necessary Entrance Counseling or Master Promissory Notes

Please note that PLUS loans are credit based and require a separate application process. Please visit <http://www.studentloans.gov> for additional information. PLUS credit checks/application expire within 90 days, so be sure to wait until 90 days or less prior to the start of the term you are attending before you apply.

If you make a mistake while accepting your award, do not worry, we can fix it for you! Just visit the Financial Aid Forms page and submit a copy of the Student Loan Revision Request form so we can make the necessary adjustments for you.

You are responsible for notifying the OSU Office of Financial Aid and Scholarships in the event that you receive any additional awards from any other source. The OSU Office of Financial Aid and Scholarships will then make any required revisions to your aid package. The receipt of additional aid may result in a reduction or elimination of aid from university-administered programs, even if it has already been paid.

TYPES OF FINANCIAL AID

Federal Programs

Federal Pell Grant – The Federal Pell Grant is a need-based grant from the federal government intended for undergraduate students who have not earned a bachelor's degree. Each student's award amount is determined on the basis of family circumstances and cost of attendance. After the Free Application for Federal Student Aid (FAFSA) is filed, the Department of Education sends you a Student Aid Report (SAR) or an Information Acknowledgement if you filed

online. These documents will indicate if you are Pell eligible and it is important to review them for accuracy.

Federal Supplemental Educational Opportunity Grant (FSEOG)

– The Federal Supplemental Educational Opportunity Grant is awarded to undergraduate students with exceptional financial need and is administered by the OSU Office of Financial Aid and Scholarships. Funds are limited and eligibility is based in part by meeting the OSU priority FAFSA submission deadline of February 28.

Federal College Work-Study Program (FWS)

– The Federal Work-Study (FWS) program provides part-time jobs for students with financial need to help them pay for their education. It's designed to put you to work in the community or in a job related to your studies, whenever possible. The program is administered by the OSU Office of Financial Aid and Scholarships. Funds are limited and eligibility is based on need and in part by meeting the OSU priority FAFSA submission deadline of February 28. The amount of FWS indicated on your award is the maximum amount you may earn for the academic year. Funds are paid monthly on the basis of hours worked in the pay period not to exceed 20 hours per week. Wages range from the state minimum rate up to \$10.00 per hour, depending on job responsibilities.

Federal Perkins Loan – A Federal Perkins Loan is a low-interest (5 percent) loan for full-time undergraduate, postbaccalaureate, and graduate students. Funds are limited and eligibility is based on need and in part by meeting the OSU priority FAFSA submission deadline of February 28. Perkins Loans are made through OSU's Financial Aid office. OSU is your lender, and the loan is made with government funds. Repayment and Deferment options are handled by the OSU Business Affairs Student Loan Office. Students must be enrolled at least half-time and repayment begins nine months after graduation, withdrawal, or if you drop below half-time enrollment. **The maximum loan amount per year at OSU depends on available institutional funds and may not meet the federal yearly maximum.**

Federal Direct Ford Loan Program

– Direct Stafford Loans, from the William D. Ford Federal Direct Loan (Direct Loan) Program, are low-interest loans for eligible students to help cover the cost of higher education. Eligible students borrow directly from the U.S. Department of Education (the department) at participating schools. The maximum yearly amount for any combination of Direct Subsidized and Unsubsidized Stafford/Ford Loan as set by the federal

government and based on class rank are:

- \$5,500 for the first year of undergraduate study (freshman=0–44 credits);
- \$6,500 for the second year of undergraduate study (sophomore=45–89 credits);
- \$7,500 per academic year for the remaining years of undergraduate study (junior/senior=90+ credits);
- \$20,500 per academic year for graduate students.

The **Subsidized** Federal Direct Ford Loan is need-based with the government paying the interest on the loan while the student is enrolled. Students must be enrolled at least half-time and repayment begins six months after graduation, withdrawal, or if you drop below half-time enrollment. For current interest rates, visit <http://www.oregonstate.edu/financialaid>.

The **Unsubsidized** Federal Direct Ford Loan is non-need-based with the student being responsible for paying the interest while enrolled. Students may choose to defer the interest by having it added to the principal, which is called capitalization. Students must be enrolled at least half-time and repayment begins six months after graduation, withdrawal, or if you drop below half-time enrollment. The maximum annual loan limit is \$2,000. For current interest rates, visit <http://www.oregonstate.edu/financialaid>.

Independent undergraduate students are eligible to borrow an additional Federal Direct Unsubsidized Ford Loan amount. Dependent undergraduates may not borrow from this program, unless an exception is made by a financial aid advisor due to the student's parent being denied the FDPLUS loan. The additional loan limits are:

- \$4,000 for the first year and second year of undergraduate study;
- \$5,000 per academic year for the remaining years of undergraduate study.

Graduate students are only eligible to receive Unsubsidized Direct Loans effective July 1, 2012. The annual loan maximum is:

- \$20,500 per academic year for graduate students.

The total debt you can have outstanding from all Federal Stafford/Ford Loans combined is:

- \$31,000 as a dependent undergraduate;
- \$57,500 as an independent undergraduate;
- \$138,500 as a graduate or professional student, which includes all loan amounts received for undergraduate study.

Federal Direct Parent Loan for Undergraduate Students (FDPLUS)

– The FDPLUS is a federal loan borrowed

by the parent on behalf of a dependent student to assist with educational expenses. Students are awarded the maximum amount they are personally eligible to receive. Parents may borrow the remaining amount up to the cost of attendance in the form of a Parent PLUS loan. As with all loans, you are not required to take it. Parents are required to complete a FAFSA application to be eligible for a Direct PLUS Loan, and the parent must complete a Direct PLUS Loan Application and Master Promissory Note (MPN) on the Federal Loan website. The PLUS is a non-need based loan. Interest is charged on the loan from the date the first disbursement is made until the loan is paid in full. Payment can be deferred while the student is attending school at least half-time, but interest will continue to accrue. For current interest rates, visit <http://www.oregonstate.edu/financialaid>.

STATE AND INSTITUTIONAL PROGRAMS

Campus Scholarships – Limited merit and need-based campus scholarships are administered by the Office of Financial Aid. Eligibility is limited to students who have completed fewer than 12 terms and submit the aid application (FAFSA) by February 1. Recipients must be enrolled full time and are notified of their awards in writing.

Departmental Awards – Each department on campus administers their own awards. Contact the department or donor directly for specific information regarding the award. For a searchable database of scholarships, visit: <http://www.oregonstate.edu/scholarships>.

Private Awards – These awards come from outside donors and can affect your financial aid package. Outside scholarship checks should be mailed to Student Accounts at the following address: Student Accounts, Oregon State University, PO BOX 1086, Corvallis, OR 97339. If you have not already submitted notification to the Financial Aid Office regarding your outside scholarships, please submit the Reporting Additional Sources of Assistance form located on the Financial Aid website. Please review your scholarship payment status through Online Services as funds will be credited to your student billing account when received.

State of Oregon Opportunity Grant – The Opportunity Grant is a state grant administered by the Oregon Student Access Commission (OSAC) and awarded to full-time undergraduates Oregon residents based on need and allowable funding. Twelve terms of eligibility are possible. This grant is not available during summer term.

OTHER PROGRAMS

Private Supplemental/Alternative Loan – Students needing additional funding for school, whose aid package has not fully met their cost of attendance, may opt to apply for funding through a private lending agency. These loans have a variable interest rate, and a credit check must be done on all applicants. OSU cannot recommend lenders for private/alternative loans.

GRADUATE STUDENTS

Graduate students are only eligible to receive Unsubsidized Direct Loans effective July 1, 2012. The annual loan maximum is \$20,500 per academic year for graduate students with an aggregate borrowing limit of \$138,500, which includes all loans borrowed for undergraduate study. Students must be enrolled at least half time (5 credits) and repayment begins six months after graduation, withdrawal, or if you drop below half-time enrollment. For current interest rates, visit <http://www.oregonstate.edu/financialaid>.

In addition to Unsubsidized Direct Loan eligibility, Graduate Students can also apply for a GRAD PLUS loan to help cover education expenses.

The terms and conditions applicable to PLUS Loans for parents also apply to PLUS Loans for graduate and professional students. These terms and conditions include a determination that you (the applicant) do not have an adverse credit history.

Before you can receive a PLUS Loan, your school must have determined your maximum eligibility for Direct Unsubsidized Stafford Loans.

In addition to these Federal Aid Programs, the Graduate School offers additional information on Assistantship, Grant and Scholarship Opportunities on their website.

RECEIPT OF AID FUNDS

OSU Office of Business Affairs is responsible for disbursing refunds from student accounts once financial aid has been applied to your student account. You must be registered and have your tuition and fees billed to your account for financial aid to be applied. Aid funds are never made available in advance. Textbooks cannot be charged to a student's account. It is assumed that the student will purchase textbooks out-of-pocket and use any refund to "reimburse" themselves for the costs. If a credit balance remains on your student account after current university charges are paid, you will be issued a refund. Federal Work-Study earnings are paid by payroll check to you each month for hours worked. You may receive a refund and still have an outstanding balance on your account. For more information about your bill or refund, visit the Business Affairs website.

Delayed Disbursements

There are several ways in which your aid may be delayed. Here are the most common reasons:

- You may be required to complete Entrance Counseling and sign a Master Promissory Note (MPN) for your Ford Direct Loans. You would have been notified of these requirements via an email to your ONID email account.
- Dropping classes (below 12 for undergraduates, 9 for graduates). All students are assumed to be full-time unless they notify Financial Aid in writing that they will be less. If you are not enrolled at full-time and have not notified us, your aid will not disburse.
- Registering late for classes.
- Being waitlisted for classes. These classes do not count toward your enrollment level until you are actually enrolled in them.
- Having unsatisfied requirements with your financial aid file that you have not completed.

You are responsible for managing your Financial Aid experience, so be sure to check Online Services frequently and review any emails you receive from us as they may include requests for additional information or action.

LOANS

Borrowed money you repay with interest.

• Federal Perkins Loan

The Federal Perkins Loan is a need-based, university administered federal loan with a 5 percent interest rate. The Federal Perkins Loan is interest-free while the student is enrolled at least half time. Repayment begins nine months after graduation or withdrawal. Students are considered for the Federal Perkins Loan on the basis of their financial aid application (FAFSA). The loan is made available to full-time undergraduates, post-baccalaureate and graduate students with high financial need. The maximum loan amount per year at OSU depends on available funds and may not meet the federal maximum. Payments and the length of the repayment period depend on the size of your debt with up to 10 years to repay. Deferments are possible under certain conditions and are handled by the OSU Business Affairs Office.

• William D. Ford Federal Direct Loan Program

The following loans are awarded by the OSU Office of Financial Aid and Scholarships to students on the basis of their financial aid application (FAFSA). Under this program, the loan funds come directly from the U.S. Government. A fee of up to 1.5 percent of the loan is

deducted proportionately from each disbursement.

• **Federal Direct Subsidized Ford Loan**

This is a need-based federal loan with a fixed interest rate of 6.8 percent for new borrowers. The interest rate is set by federal legislation. The government pays the interest on the loan while the student is enrolled at least half time. Repayment begins six months after graduation, withdrawal, or if a student drops below half time. For current interest rates, visit <http://www.oregonstate.edu/financialaid>.

• **Federal Direct Unsubsidized Ford Loan**

This is a non-need-based federal loan for both undergraduate and graduate students. The student is responsible for paying the interest while enrolled, but may choose to defer the interest payment until repayment begins six months after graduation, withdrawal, or if a student drops below half time. For current interest rates, visit <http://www.oregonstate.edu/financialaid>.

The maximum yearly loan amount for any combination of Direct Subsidized and Direct Unsubsidized Ford Loan as set by the federal government and based on class rank are:

- \$5,500 for the first year of undergraduate study (freshman=0–44 credits);
- \$6,500 for the second year of undergraduate study (sophomore=45–89 credits);
- \$7,500 per academic year for the remaining years of undergraduate study (junior/senior=90+ credits);

Independent undergraduate students are eligible to borrow an additional Federal Direct Unsubsidized Ford Loan amount. Dependent undergraduates may not borrow from this program, unless an exception is made by a financial aid advisor due to the student's parent being denied the FDPLUS loan. The additional loan limits are:

- \$4,000 for the first year and second year of undergraduate study;
- \$5,000 per academic year for the remaining years of undergraduate study.

Graduate students are only eligible to receive Unsubsidized loan funds effective July 1, 2012. The annual loan maximum is:

- \$20,500 per academic year for graduate students.
- The total debt you can have outstanding from all Stafford/Ford loans combined is:
- \$31,500 as a dependent undergraduate;
- \$57,500 and an independent undergraduate;
- \$138,500 as a graduate or professional student, which includes

all loan amounts received for undergraduate study.

- \$224,000 as a graduate health professional student

• **Federal Direct Parent Loan for Undergraduate Students (FDPLUS)**

The FDPLUS is a federal loan borrowed by the parent on behalf of a dependent student to assist with educational expenses. Students are awarded the maximum amount they are personally eligible to receive, after which PLUS loans are automatically offered to the parents of dependent students to meet the cost of attendance. As with all loans, you are not required to take it. Parents are required to complete a FAFSA application to be eligible for a Direct PLUS Loan, and the parent must complete a Direct PLUS Loan Application and Master Promissory Note (MPN) on the Federal Loan website, <http://www.studentloans.gov>. The PLUS is a non-need based loan. Interest is charged on the loan from the date the first disbursement is made until the loan is paid in full. Payment can be deferred while the student is attending school at least half-time, but interest will continue to accrue. For current interest rates, visit <http://www.oregonstate.edu/financialaid>.

REQUESTING CHANGES

It is understood that you want as much grant and scholarship money as possible. When you are awarded your financial aid, your award will reflect your eligibility for available grant aid. When accepting your award, you may always request a lesser loan amount. Please note that loan funds are divided into equal disbursements, based on your enrollment at OSU within the given year. You may replace your Federal Work-Study funds with a Direct Ford loan, however this is dependent upon your loan eligibility. In addition, if you initially decline loan funds but find later that you in fact need them, you may also request that the loan be reinstated up to the total of your original offer. Please request any changes in writing by submitting a Loan Revision Request form to the financial aid office. Be aware that not all budget requests can be accommodated.

Additional Costs

In certain instances, your cost of attendance may be adjusted to include other allowable costs incurred to meet your educational needs. Requests are reviewed on a case-by-case basis to determine approval. Documentation of the additional expense must be included for consideration. If approved, additional expenses are usually funded with "self-help" assistance in the form of loans. Adjustments are not made for consumer debts, car payments, or private school tuition.

Adjustments may include, but are not limited to:

- Medical or dental cost not covered by insurance
- Computer expense (one time allowance)
- Child care cost for children 12 and under
- Commuting costs from outside the Corvallis area
- Costs related to students with disabilities
- Study abroad program fees

Parent or Student Expected Contributions (EFC)

The information you reported on your FAFSA is used to calculate a number called the Expected Family Contribution (EFC). The EFC is not the amount of money that your family must provide. The school uses the EFC to determine the amount of your federal grants, loans, or work-study awards for which you may be eligible.

Changes in your situation:

Financial Aid offices may consider special or unusual circumstances that impact your family situation. Examples such as loss of employment, a one-time benefit (that affected your previous year's tax return), a change in marital status since filing the FAFSA, and major medical or dental expenses, may be considered. For more information please download and review the appeal form, and feel free to contact us with any questions you might have.

RENEWING AID

You must apply for financial aid every year by submitting a FAFSA application. Applications must be received before February 28 at the central processor to be considered for priority funding. You may apply for aid online after Jan. 1 for the following academic year. Below are a few of the issues that may affect you as a continuing OSU student and financial aid recipient. Be sure to keep on top of managing your award!

DROPPING COURSES AND THE CENSUS DATE

Dropping courses impacts your financial aid in several ways. Aid assistance is based on your enrollment level each term and may be adjusted accordingly. All students are initially awarded based on full-time enrollment. Full-time undergraduate status is 12 or more credits, 3/4 time is 9–11 credits, 1/2 time is 6–8 credits, and anything below 6 credits is considered less than half time. Changes in your enrollment levels may affect your financial aid eligibility.

Your financial aid is paid each term based on your level of enrollment at the "census date". The term Census Date refers to the point at which your enroll-

Yearly Loan Limits

If you have been awarded a Ford loan, you are eligible for additional Ford loan funding as you progress through school. Depending on your credits and class standing, you will be able to receive different loan amounts. Below are the credit requirements and loan amounts:

Class Standing	Credits	Loan Limit (Dependent)	Loan Limit (Dependent)
Freshman	0-44	\$5,500	\$9,500
Sophomore	45-89	\$6,500	\$10,500
Junior/Senior	90-up	\$7,500	\$12,500

If you change class standing in either fall or winter term, you may request that your loans be increased for the current academic year. Download and complete the Loan Revision Form and return it to the Office of Financial Aid and Scholarships for review.

ment is locked for financial aid purposes, and it happens to coincide with the last date you can add or drop classes for a full tuition refund. This Census Date is used for all terms, including the summer session. At this point in the term, credit hours are locked and financial aid for the term is adjusted to reflect the student's official enrolled credits. For example, if the student received aid at the beginning of the term based on full-time enrollment and then dropped credits, aid is then revised to match their eligibility based on the number of credits enrolled in as of the Census Date and types of aid that were awarded. Credits added after the Census Date cannot be used to increase financial aid eligibility.

When you drop credits after the census date and your aid has been paid, you will not need to repay your financial aid you unless you completely withdraw from ALL classes for the term. You will instead need to be concerned with meeting Satisfactory Academic Progress, as this will affect your overall PACE (completion rate).

WHAT HAPPENS IF I WITHDRAW?

Students who withdraw from the university after the start of the term must complete a Withdrawal Form through the Registrar's Office ("Withdraw from the University for the Term") and contact the Office of Financial Aid and Scholarships. If financial aid funds were used to pay tuition and fees, and a student withdraws, any refundable tuition amount is returned to the appropriate financial aid sources (refer to the tuition/fee refund schedule in the OSU Schedule of Classes).

Return of Title IV Funds and Withdrawal Record

OSU is required to calculate the return of Title IV financial aid funds for students that officially or unofficially withdraw during the academic term. Students who do not intend to complete the term for which they are enrolled, should follow the official withdrawal process as outlined by university regulations. This calculation determines the amount of

aid funds that must be returned by the institution as well as how much aid the student must return for the period of non-enrollment. If a return of aid amount is calculated, the funds must be repaid to the financial aid programs in the following order:

- Federal Direct Unsubsidized Ford Loan
- Federal Direct Ford Loans
- Federal Perkins Loan
- Federal Direct PLUS Loan
- Federal Pell Grant
- FSEOG

The amount of federal aid that you must repay is determined via the Federal Formula for Return of Title IV funds (Section 484B of the Higher Education Act). This law also specifies the order in which funds are to be returned to the financial aid programs from which they were awarded, starting with loan programs.

You may be required to make a repayment when cash has been disbursed from financial aid funds, in excess of the amount of aid that you earned (based on the date of your total withdrawal) during the term. The amount of Title IV aid earned is determined by multiplying the total Title IV aid (other than FWS) for which you qualified by the percentage of time during the term that you were enrolled.

If less aid was disbursed than was earned, you may submit a request to receive a late disbursement for the difference.

If more aid was disbursed than was earned, the amount of Title IV aid that you must return (i.e. not earned) is determined by subtracting the earned amount from the amount actually disbursed.

The responsibility for returning unearned Title IV aid is shared between the university and you. It is allocated according to the portion of disbursed aid that could have been used to cover university charges, and the portion that could have been disbursed directly to you once those charges were covered. OSU will distribute the unearned aid back to the Title IV programs, as specified by law. You will be notified if you owe a repayment due to

an official/unofficial withdrawal within 45 days of the date the determination of the withdrawal is made.

You will be billed for the amount that you owe to the Title IV programs, as well as any amount due to the university, as a result of Title IV funds that were returned that would have been used to cover university charges.

Students who have received aid and then withdraw will have future funds withheld. Students must appeal in writing to the OSU Office of Financial Aid and Scholarships regarding their academic progress and future aid eligibility.

STUDENT RESPONSIBILITIES

Reporting Changes

Your financial aid is based on the information submitted to our office for the current academic year in which you requested aid. To keep your file current and accurate, you are required to report the changes to the OSU Office of Financial Aid and Scholarships. You should expect a revision of your award in most cases. Reasons for changes can include but are not limited to:

- Additional financial assistance: scholarships, grants, loans, fee waivers, Tribal Assistance, tuition/book support, social security benefits or any other monetary award not reported previously.
- Receipt of graduate teaching or research assistantship, and/or fellowship.
- Receipt of resident advisor position or ROTC stipend and scholarship
- Changes in enrollment hours and/or withdrawal from the university
- Changes in residency status for tuition purposes.
- Change in course load if below full time.

Entrance and Exit Interview

All Federal Direct Ford loan recipients are required to complete an entrance interview prior to receiving the first disbursement of their loan proceeds. They are also required to complete an exit interview during their last term of attendance. (For further information, visit <http://www.studentloans.gov>).

Applying Annually

You must submit a financial aid application (FAFSA) for each academic year in which you want to be considered for financial aid assistance. Oregon State University is not obligated to continue aid beyond the last term stated on the award letter.

Appeals

Students who are not satisfied with a decision of a financial aid staff member may appeal that decision, in writing, and then in person to the following staff in the order indicated: the director of

Financial Aid and Scholarships, and then the Financial Aid Appeals Subcommittee. The decision of the director and/or Financial Aid Appeals Subcommittee will be considered final.

STUDENT ENROLLMENT LEVELS

Federal financial aid eligibility and deferment of student loans are affected by enrollment levels. Summer enrollment levels are the same as other terms.

Undergraduate

Full Time: 12 or more credits in a term

Three Quarter Time: 9 to 11 credits in a term

Half Time: 6 to 8 credits in a term

Graduate

Full Time: 9 or more credits in a term

Half Time: 5 to 8 credits in a term

SCHOLARSHIP MANAGEMENT SYSTEM (SMS)

Students seeking scholarships are encouraged to use the centralized Scholarship Database at https://scholarship.ucsadm.oregonstate.edu/prod/search_schol.php

For further information, contact Jessica Abblitt, Assistant Director of Scholarships, Office of Financial Aid and Scholarships, 541-737-9056, jessica.abblitt@oregonstate.edu.

General Honor Societies					
Organization	Men/ Women	Date Est. Nationally	Date Est. at OSU	Type or Field of Interest	Current Email Contact
Alpha Lambda Delta	Both	1924	1933	First-year scholarship	alphalambdadelta@oregonstate.edu
Alpha Nu Sigma	Both			Applied nuclear science and engineering	alphanusigma@oregonstate.edu
Alpha Pi Mu	Both	1949	1969	Industrial engineering	alpha.pi.mu@oregonstate.edu
Eta Kappa Nu	Both	1904	1921	Electrical engineering and computer science	hkn@oregonstate.edu
Mortar Board	Both	1918	1933	Senior leadership	mortarboard@oregonstate.edu
National Residence Hall Honorary	Both	1964	2000	Residence hall leadership	nrhh@oregonstate.edu
National Society of Collegiate Scholars	Both	1994	2002	First and second year scholarship	nscs@oregonstate.edu
Psi Chi	Both	1929	2002	Psychology	Psi.chi@oregonstate.edu
Tau Beta Pi	Both	1885		Engineering	taubetapi@oregonstate.edu
University Scholars Student Assoc.	Both			Scholarship	ussa@oregonstate.edu
Xi Sigma Pi	Both	1908	1921	Forestry	xisigmapi@oregonstate.edu
Pi Mu Epsilon	Both	1914	1938	Math	pme@math.oregonstate.edu
Order of Omega	Both	1959	1976	Greek-letter Organizations – Leadership & Scholarship	orderofomega@oregonstate.edu
Kappa Kappa Psi	Both	1919	1923/ 2009	Band	kappakappapsi@oregonstate.edu
Professional Fraternities and Other National Societies					
Organization	Men/ Women	Date Est. Nationally	Date Est. at OSU	Type or Field of Interest	Current Email Contact
Alpha Kappa Psi	Both	1904	1914	Business	akpsi@oregonstate.edu
Equine Practitioners, American Association of	Both	1954		Veterinary medicine	equinepractitioners@oregonstate.edu
Nuclear Society/ Health Physics Society, American	Both			Nuclear engineering and radiation health physics	ans@oregonstate.edu
Civil Engineers, American Society of	Both		1978	Civil engineering	asce@oregonstate.edu
Mechanical Engineers, American Society of	Both	1880		Mechanical engineering	ASME@oregonstate.edu
Arnold Air Society	Both	1947	1951	Air Force	arnoldairsociety@oregonstate.edu
Associated General Contractors of America	Both	1918		Engineering and construction	Associatedgeneralcontractors@oregonstate.edu
Beta Alpha Psi	Both	1919	1922	Accounting	Club_bap@bus.oregonstate.edu

Professional Fraternities and Other National Societies					
Electrical & Electronics Engineers, Inst. of	Both	1963		Electrical and electronics engineering	ieee@oregonstate.edu
Transportation Engineers-OSU Student Chapter, Inst. of	Both	1930		Transportation and traffic engineering	transportationengineers@oregonstate.edu
Int'l Interior Design Assn. Student Chapter	Both	1994		International interior design	iidastudentchapter@oregonstate.edu
International Forestry Student Assn., OSU	Both	1990	2005	International forestry	IFSAOSU@oregonstate.edu
Healthcare Executives-Student Chapter, OSU Society of	Both			Healthcare executives	healthcareexecutives@oregonstate.edu
American Veterinary Medical Assn., OSU Student Chapter of the	Both	1863		Veterinary medicine	scavama@oregonstate.edu
American College of Veterinary Pathology, OSU Student Chapter of the	Both	1949		Veterinary pathology	vetmedpathclub@oregonstate.edu
Phi Delta Chi	Both	1893	1982	Pharmacy	phideltachi@oregonstate.edu
Home Builders, Student Assn. of (Home Building and Design Club)	Both	1942		Home builders	homebuildinganddesign@oregonstate.edu
Physics Students, Society of	Both	1968		Physics	physicsstudents@oregonstate.edu
Veterinary Business Management Assn.	Both	2001		Veterinary business management	vetbusiness@oregonstate.edu
Young Cattlemen's Assn.	Both			Cattle industry	ycaa@oregonstate.edu
AMA@OSU Marketing Group	Both	1937		Marketing Students	AMA@oregonstate.edu
Animal Hospital Association, American	Both	1933		Veterinary Medicine	americananimalhospital@oregonstate.edu
Institute of Industrial Engineers, Student Chapter @ OSU	Both	1948		Industrial Engineering	industrialengineers@oregonstate.edu
Minorities in Agriculture, Natural Resources and Related Sciences	Both	1986	1994	Minorities in Agriculture & Related Sciences	manrrs@oregonstate.edu
Conservation Biology, Society for	Both	1985	2010	Conservation Biology	conservationbiology@oregonstate.edu
Women Engineers, Society of	Women	1950		Women in Engineering	womenengineers@oregonstate.edu

Contact: Danté Holloway, Coordinator, Student Organizations, Memorial Union 103, dante.holloway@oregonstate.edu

ART AND MUSIC

Yuji Hiratsuka, *School of Arts and Communication*
541-737-5006
yhiratsuka@oregonstate.edu

Marlan Carlson, *School of Arts and Communication*
541-737-5591
mcarlson@oregonstate.edu

Art exhibits, lectures, concerts, and recitals sponsored by the School of Arts and Communication, Memorial Union Program Council, and student musical and art organizations play a central part in the cultural life of the community. Under the patronage of the Memorial Union, exhibitions in the Memorial Union stimulate interest in architecture, painting, sculpture, and related arts. They offer students knowledge of their cultural heritage and an awareness of contemporary art movements.

The School of Arts and Communication features the Fairbanks Gallery of Art <http://oregonstate.edu/fairbanksgallery/About.html>, which features exhibitions focusing on contemporary Northwest, national, and international artists. This program provides the campus and student communities diverse creative experiences and interactions. The Visiting Artists and Scholars Lectures Series also brings internationally acclaimed artists to the school for free public lectures.

Student and faculty art exhibits are shown in various galleries throughout the year (see "Museums, Galleries, Collections.")

Noncredit classes in ceramics, photography, woodworking, weaving, and glass are offered through the Memorial Union Craft Center.

The School of Arts and Communication offers more than two dozen performance ensembles, giving student musicians of all majors the opportunity to participate at their level of ability. Students enroll in these organizations as a class and earn regular credit. Some ensembles require an audition. All require a consultation with the instructor. The Corvallis-OSU Symphony Orchestra, Wind Ensemble, Campus Band, Chamber Choir, Bella Voce women's chorus, Meistersingers men's chorus, OSU Opera Workshops, jazz band, and the athletic bands present numerous performances on or near campus, in which free or reduced-price tickets are available to students. Faculty members and advanced music majors also perform free, public recitals throughout the school year. The OSU Steinway Piano Series, Chamber Music Corvallis and the Corvallis-OSU Symphony Orchestra bring artists of international fame to campus for public concerts. The Music à la Carte Concert

series, held most Thursdays at noon in the Memorial Union Lounge, gives students and faculty the opportunity to see fine amateur and professional chamber, jazz, and ethnic musicians and performance ensembles for free over the lunch hour. Several dance recitals are also given each year under the auspices of the College Health and Human Sciences and other organizations.

ASOSU OFFICE OF ADVOCACY

Patricia Lacy, *Advocate*
131 MU East
541-737-6349
Patricia.lacy@oregonstate.edu
Websites: <http://oregonstate.edu/dept/asosu-advocacy>

****The Office of Advocacy does not handle immigration, taxes, copyright, patent, small business or real estate issues.****

The following are some of the areas with which the Office of Advocacy assists:

- Academic Dishonesty
- Financial Aid
- Privacy
- Student Conduct
- Tuition, Fees, Business
- On-Campus Disputes with OSU Security Officers/Oregon State Police
- Faculty Misconduct
- Grade Appeals
- Parking
- Residency Appeals
- Student Health Insurance
- University Housing & Dining Services/The Gem
- INTO OSU

If you are unsure whether your issue falls within the scope of the Office of Advocacy, please contact one of our student interns at 541-737-9200 for clarification.

About Us

The Office of Advocacy has worked with thousands of students in a wide array of conflicts. Since 2000, the Office of Advocacy has served to empower and support students within the university. In addition to helping with conflicts, researching and providing general assistance to students, we work to support and further the best interest of students throughout the university. We encourage all students to contact our office with any questions or disputes that involve the university.

ASOSU STUDENT ADVOCATE

Drew Desilet, *Student Advocate*
149 Snell Hall, Corvallis, Oregon 97331
541-737-8237
drew.desilet@oregonstate.edu
or student.advocate@oregonstate.edu
Website: <http://asosu.oregonstate.edu/>

The ASOSU Student Advocate serves as a community organizer and political advisor for students, while providing a level of faculty and staff support to the student leaders of the ASOSU. This position provides direct support to ASOSU, student organizations and individuals in their grassroots efforts to create change that improves the lives of students. The ASOSU Student Advocate also helps to coordinate the ASOSU Organizing for Social Change Internship Program, which includes a range of introductory and advanced courses designed to advance student government leadership by familiarizing students with direct-action, community and grassroots organizing, movement-building and capacity-building, political identity development, government relations, and tactics for addressing contemporary and historical issues facing students, as well as related concepts central to engaging student governance. The student advocate also exists to provide logistical expertise to student leaders in planning and implementation of events, trainings, and professional development.

ASSOCIATED STUDENTS OF OREGON STATE UNIVERSITY

ASOSU
149 Snell Hall
541-737-2101
541-737-5560 FAX
asosu@oregonstate.edu
Website: <http://asosu.oregonstate.edu>

The Associated Students of Oregon State University (ASOSU) is an alliance encompassing all students at OSU. The **elected and appointed officers** comprise the officially recognized student government at OSU. The ASOSU represents students at the campus, community, state, and federal levels on issues that directly influence the quality of, and access to, post-secondary education. ASOSU provides numerous opportunities for leadership development and professional experience in areas as diverse as political organizing and other forms of social activism.

The structure of ASOSU is similar to other forms of national government. Governance is shared among three branches—the legislative, judicial, and executive. The legislative portion is divided into two bodies, the **ASOSU House of Representatives** and the **ASOSU**

Senate. House Representatives and Senators are elected by popular vote during the student officer elections in spring term of each academic year. The judiciary function in ASOSU is carried out by the **Judicial Council.** The Judicial Council, comprised of seven students at large, oversees any controversies or cases that involve interpretation of the ASOSU Constitution.

The **Executive branch** is led by the president and vice president whom are elected as a ticket by popular vote of the entire student body. Upon election, this executive duo appoints executive officers, service directors, 10 taskforce directors, as well as various support staff. Each executive appointee is subject to approval by the ASOSU Congress. Those **seeking employment with ASOSU are welcome and encouraged to apply for positions during the spring hiring process, which usually takes place early in May.**

ASOSU is constantly seeking **interns and volunteers** and future leaders who are ambitious about making a difference in the lives of OSU students.

There are a number of ways to **get involved in a broad range of interests and topics.** One of the easiest ways to get involved in ASOSU is to simply volunteer. Volunteers work at their own pace and choose their level of involvement.

Through the **ASOSU Organizing for Social Change Internship Program**, students spend between 2 to 6 hours per week working with any of the various members of the executive branch, as well as attend a class one night a week to learn fundamental leadership and organizing skills. The Internship is a great way to create your own path into campus governance at OSU.

Students can also serve as representative on one of the various campus **committees** at OSU that govern issues ranging from public safety to budgets and fiscal planning. Students who serve on a university committee are eligible to receive academic credit.

If you are interested in getting involved in one of the nation's premiere student governments, or have any questions or concerns regarding any other matter, please feel free to contact ASOSU anytime.

ATHLETICS

Kyle Pifer, *Senior Associate Athletic Director – Compliance*
kyle.pifer@oregonstate.edu

Diana Ulrey, *Assistant Director of Compliance*
diana.ulrey@oregonstate.edu
132 Gill Coliseum
541-737-7369
Website: <http://www.osubeavers.com/>

Oregon State University conducts athletic programs for men and women under the auspices of the NCAA. Men's programs compete as part of the Pacific-12 Conference in baseball, basketball, crew, football, golf, soccer, and wrestling. Women's programs also compete in the Pacific-12 Conference in basketball, cross country, crew, golf, gymnastics, soccer, softball, swimming, outdoor track, and volleyball.

CAMP (COLLEGE ASSISTANCE MIGRANT PROGRAM)

Amas Aduviri, *Director*
541-737-3923
amas.aduviri@oregonstate.edu
337 Waldo Hall
Oregon State University
Corvallis, OR 97331
541-737-2389
Website: <http://oregonstate.edu/dept/camp/>

The College Assistance Migrant Program is a federally-funded program through the U.S. Department of Education that provides support for first-year college students from migrant/seasonal farmworker backgrounds.

To be eligible, the student or the student's parents must have worked at least 75 days in the past 24 months in migrant/seasonal farmwork (including crop, dairy, poultry or livestock production, the cultivation or harvesting of trees, or work on a fish farm), be eligible for participation in a Migrant Education Program, or have attended a High School Equivalency Program (HEP) within the last 12 months and have completed a GED.

CAMP students are eligible for the following scholarships and services:

- Placement testing and academic advising
- Quarterly book allowance to cover the cost of textbooks
- Monthly stipend throughout the academic year
- Personal counseling
- Travel allowance
- Supplemental aid to reduce debt and meet financial need
- Internship in residence halls

- Orientation/study skills workshops
- Financial aid counseling
- Health services
- Free tutoring
- Career orientation, job search skills development
- Other services as needed

CAREER SERVICES

TBA, *Director*

Lindsey Reed, *Employer Relations Manager*
lindsey.reed@oregonstate.edu

TBA, *Coordinator*
Employer Services/Student Interviews

Mike Mays, *Admin Program Assistant*
mike.mays@oregonstate.edu

Jen Edwards, *Advisor*
Career Advisor & Outreach Coordinator
jennifer.edwards@oregonstate.edu

Marian Moore, *Counselor*
Career Counselor & Career Development Coordinator
marian.moore@oregonstate.edu

Carolyn Killefer, *Counselor*
Career Counselor
carolyn.killefer@oregonstate.edu

Noni Scherer, *OS-2*
Information and Assistance Specialist
noni.scherer@oregonstate.edu
B008 Kerr Administration Bldg.
541-737-4085
Website: <http://oregonstate.edu/career/>

Career Services provides career planning and employment services and resources for undergraduate students, graduate students and alumni. More than 400 employers interview OSU undergraduate students, graduate students and alumni each year in Career Services. The annual fall, winter, and spring career fairs bring nearly 300 organizations to campus to meet with students.

Career counselors are available to discuss career exploration and job search strategies. Beaver JobNet lists available jobs and internships on and off campus. Seminars in Career Services include writing cover letters and résumés, interviewing techniques, job search strategies, and co-op and internship opportunities. Resources on the job market and company information are available for student use. Listings of on campus employer recruitment schedules, job listings, and links to employer home pages, as well as other information about Career Services is available on the Web at <http://oregonstate.edu/career/>. Call 541-737-4085.

CENTER FOR CIVIC ENGAGEMENT

Emily E. Bowling, *Civic Engagement and Service Coordinator*

Oregon State University
Snell Hall 158
Corvallis, Oregon 97331-2212
541-737-3041

cce@oregonstate.edu

Website: <http://oregonstate.edu/cce/>

Facebook: <https://www.facebook.com/OSUCCE>

Twitter: <https://twitter.com/OSUCCE>

Better yourself, better the world through community engagement.

Get to know OSU's Center for Civic Engagement (CCE)! The CCE strives to engage students in community service, philanthropy and giving, and activism. Join us to further discover where your passions meet our community's needs.

In partnership with community-based organizations, the Center for Civic Engagement (CCE) facilitates meaningful service, community engagement, and educational programs. The CCE strives to:

- Engage students in service, philanthropy, and activism based work,
- Meet diverse community-identified needs,
- Inspire positive change in local and global communities,
- Enhance students' knowledge of self and sense of place, and
- Foster active citizenship and social responsibility.

Events and Programs:

- Annual Service Days (Make a Difference Day, Dr. Martin Luther King Jr. Day of Service, Earth Day Service Day, Day of Caring)
- DOT: Do One Thing to better the world
- Alternative Break Service Trips
- Non-Profit and Volunteer Fair
- National Hunger and Homelessness Awareness Week
- Bloss Hall Civic Engagement Community

Services:

- Individual service consultation to assist students in finding service opportunities and areas of passion
- Consultation for service groups and student organizations related to community service programming, service-learning education, and reflection strategies
- Networking between the OSU campus and surrounding community

Why get involved?

Here are a few potential benefits of civic engagement and community service:

- Enhance your sense of self and place
- Impact change in your areas of passion and interest

- Deepen your understanding of social issues
- Build relationships with people motivated to create change
- Explore your values, interests, and passions
- Build your leadership and practical skills
- Foster your community and professional networks and contacts
- Survey various career paths and options to aid with career decision-making
- Feel happier, people who volunteer are happier on average!
- Your community needs YOU!

CHILDCARE AND FAMILY RESOURCES

Amy Luhn, *Director*
amy.luhn@oregonstate.edu

Kristi King, *OLV Site Coordinator*
kristi.king@oregonstate.edu

Erika Woosley, *Program Assistant*
Erika.woosley@oregonstate.edu
151 Snell Hall
541-737-4906

Website: <http://oregonstate.edu/childcare>

The Childcare and Family Resources office supports parents at OSU by advocating for student parent needs, as well as the needs of all parents and caregivers on campus *and* by providing direct services, child care and other family-centered resources in support of a parent's academic and professional success. We oversee Beaver Beginnings, the campus child care center; provide free short-term drop-off child care for students with children; provide lactation rooms across campus and lactation support information; administer student and faculty/staff child care subsidy programs; provide monthly parenting education and support opportunities; and host special events for families, in addition to other services and resources. The Childcare and Family Resources office is primarily student fee funded and is directed by an advisory board of students, faculty and staff.

Our Little Village (OLV) is a short-term drop-off child care center with two locations on campus, open evenings and weekends. Drop-off child care enables student parents to take advantage of two important resources on campus: The Valley Library and Dixon Recreation Center. Any currently enrolled student may drop off their child aged 6 months to 10 years old. The free service is paid for by student fees. In The Valley Library, parents must remain in the building while their child is in care. In Dixon Recreation Center, parents may leave the facility and work or study elsewhere on campus.

COALITION FOR COMMUNITY DIALOGUE

Becky Evans, *Coordinator*,
Cultural Programs

433A Snell Hall
541-737-9857

Email: rebecca.evans@oregonstate.edu

Website: <http://oregonstate.edu/communitydialogue/>

The Coalition for Community Dialogue (formerly Team Liberation) believes in justice for humanity through dialogue, continuous learning, and intentional experiences.

Have you taken courses, attended conferences, or participated in retreats, workshops, or any other activities that have inspired in you a passion for social justice? We are building a network where people who have had experiences like these can meet to support one another and to learn and grow together. To do this, we hold regular meetings and quarterly trainings. Additionally, we hold an annual conference and sometimes do workshops, which allows people to engage with us at any level.

For more detailed explanations of these programs, check out our website at <http://oregonstate.edu/communitydialogue/> and you can follow us at <https://www.facebook.com/CoalitionforCommunityDialogueOSU>.

COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS)

Jacqueline Alvarez, *Director*
Snell Hall, 5th floor
541-737-2131

jackie.alvarez@oregonstate.edu

Website: <http://oregonstate.edu/counsel/>

Counseling and Psychological Services (CAPS) is staffed by licensed mental health professionals who are especially trained to work with university students. We provide a variety of confidential counseling, wellness, and educational services to help students address the challenges they face and to help them thrive during their time at OSU. These services are designed to help students understand themselves better, create and maintain satisfying relationships, manage anxiety and stress, improve their mood, enhance academic performance, make healthy and satisfying career and life choices, and address mental health problems that interfere with their ability to succeed. CAPS also houses Sexual Assault Support Services, which has a separate confidential phone line, 541-737-7604.

We are dedicated to helping students by providing brief counseling services, or—if more intensive or specialized care

is needed—making referrals to health care providers in the community. Our counseling services are confidential. This means that anything said to a counselor, the fact that a student used the service, or any test results, are not disclosed to other people or agencies, within the limits of professional ethical and legal standards.

All regularly enrolled Oregon State University students who have paid the Student Health and Counseling Fee are eligible for services. Ecampus students are eligible for services if they pay the entire student fee package for the quarter(s) they receive services.

CAPS staff members are strongly committed to affirming diversity in a broad sense, to treating all with dignity and respect, and to opposing discrimination, prejudice, and oppression.

DEAN OF STUDENT LIFE

Tracy Bentley-Townlin, *Interim Dean of Student Life*
tracy.bentley@oregonstate.edu

Kris Winter, *Assistant Dean of Student Life*
Kris.winter@oregonstate.edu

A200 Kerr Administration Bldg.
541-737-8748
Website: <http://oregonstate.edu/deanofstudents>

The Office of the Dean of Student Life (ODOSL) supports the university's mission by providing students with services and opportunities that enhance critical thinking, an appreciation for diversity and life-long learning. Our mission is to provide educational and developmental opportunities for students to make informed decisions that support their success at Oregon State University. We are dedicated to providing an environment that will enable students to effectively engage in their academic and intellectual work as well as develop cultural competencies, social and global awareness in order to be informed, involved and engaged citizens.

ODOSL assists students in the resolution of problems and concerns, provides information about and referral to campus resources, and promotes initiatives that address students' needs and interests. We also serve as a resource for parents, families, faculty and staff in supporting student success from the First-Year Experience program through graduation.

Learn about our programs and services by visiting the Dean of Student Life website at <http://oregonstate.edu/deanofstudents>.

DISABILITY ACCESS SERVICES

Martha Smith, *Director*
A200 Kerr Administration Bldg.
541-737-4098
martha.smith@oregonstate.edu
541-737-7354 FAX
Disability.services@oregonstate.edu
Website: <http://ds.oregonstate.edu/home/>
Accessibility Website: <http://oregonstate.edu/accessibility/>

The Disability Access Services office (DAS) offers an array of services to students with documented disabilities. Services include, but are not limited to note taking, sign language interpreting, real-time transcribing, alternative testing, transcribing and captioning media for accessibility, and conversion of text into Braille, digital text and tactile images. DAS can also assist with registration, disability-related housing needs, and access to OSU community events. DAS offers two scholarships for students with physical disabilities. DAS also assists the Office of Equity and Inclusion in supporting faculty, staff and other members of the OSU community with access consultation and accommodation requests.

EDUCATIONAL OPPORTUNITIES PROGRAM

Janet Nishihara, *Director*
337 Waldo Hall
541-737-3628
janet.nishihara@oregonstate.edu
Website: <http://oregonstate.edu/dept/eop/>

The Educational Opportunities Program (EOP) was created at Oregon State University in 1969 and provides a welcoming environment that supports the full development of the personal and academic potential of students who have traditionally been denied equal access to higher education.

These groups include students of color, older-than-average students, students with disabilities, students who are single parents, low-income students, students who have been rurally isolated, veterans, and students who are the first generation in their family to attend college.

The goals of the program include providing services which will:

- acclimate students to university culture,
- enhance each student's academic performance,
- develop each student's professional and personal growth, and
- assist students in developing a sense of belonging and a strong connection to the university.

Students in the program will have access to the following services:

- assistance through the admissions process,
- assistance in locating financial resources,
- orientation to the university,
- academic and personal counseling,
- courses in math, reading and writing, and
- assistance with finding jobs and internships,
- assistance with international study experience and undergraduate research, and
- support in writing resumes and cover letters.

U.S. citizens or permanent residents interested in learning more about the program or in applying for services should visit the EOP website: <http://oregonstate.edu/dept/eop/>.

FORENSICS

Mark J. Porrovecchio, *Director*
541-737-8230
Shepard Hall 205
Website: <http://groups.oregonstate.edu/forensics/>

OSU's nationally recognized forensics program invites all undergraduates to participate in speech and debate activities. Continuing a tradition at Oregon State that started in 1890s, the forensics team involves members from all majors and schools on campus. Each year, students compete in state, regional, national, and international intercollegiate tournaments. Events include public debate (following the limited preparation model of the Lincoln-Douglas format) and individual public speaking formats such as informative, persuasive, and after dinner, as well as a range of oral interpretation categories involving prose, poetry, and drama. The team travels to tournaments in both the fall and winter terms.

FRATERNITIES AND SORORITIES (GREEK LIFE)

Brandon Lee, *Interim Assistant Director*
Snell Hall Room 433C-D, 541-737-5432
Brandon.Lee@oregonstate.edu
Website: <http://oregonstate.edu/cfsl/>

Oregon State University is host to 47 different fraternities and sororities representing three governing councils of the College Fraternity Movement. The Greek experience on the OSU campus places emphasis on academic achievement, community building, community service, service learning, and preparing the Greek students for leadership roles following graduation.

The Greek community participates in leadership roles as ASOSU officers, *Barometer* staff members, MUPC chairs, resident assistants, and varsity athletes.

Representing approximately 13.6 percent of the undergraduate student population, the Greek community at OSU has provided 99 continuous years of excellence in service and support to Oregon State University.

Students interested in exploring membership in a fraternity or sorority may contact the Center for Fraternity & Sorority Life at Snell Hall Room 433C-D, Corvallis, OR 97331; 541-737-5432, or visit our website for additional information, <http://oregonstate.edu/cfsl/>.

HUMAN SERVICES RESOURCE CENTER

Clare Cady, HSRC Coordinator
233 Snell Hall
541-737-3747
hsrc@oregonstate.edu
Website: <http://oregonstate.edu/hsrc/>

We provide direct service, outreach, education, and referral services to OSU students that help alleviate the effects of hunger, poverty, and other human needs so that students can pursue a quality education. We also create a dynamic learning environment in which students, faculty, and the community can learn how to meet the current pressing societal challenges facing college students.

How HSRC Helps Students

- Intermediary services between students and agencies that provide rental assistance, utility assistance, food stamps, childcare, food boxes, and health insurance.
- Workshops, seminars, and opportunities for internships and employment.
- Connection to community service opportunities.
- Assistance in maintaining food and health insurance subsidies through the university.
- Applications for food stamps.

If you have any questions or concerns, please feel free to stop by our office in 233 Snell Hall, call us at 541-737-3747, or email us at hsrc@oregonstate.edu.

INTERCULTURAL STUDENT SERVICES

Allison Davis-White Eyes, Director
Maleah Harris, Administrative Assistant
A150 Kerr Administration Building
541-737-9030
541-737-7874 FAX
ISS@oregonstate.edu
Website: <http://oregonstate.edu/dept/iss/>

Intercultural Student Services (ISS), a department of the Division of Student Affairs, is the home of initiatives, programs and services regarding African/African-American; Asian American; Pacific Islander; American Indian; Latina/o; multi-racial; lesbian, gay, bi, transgender students; women; and multiple identity students.

Our work is grounded in ideals of social justice, equity, and a dedication to facilitating experiences in which all students reach their full potential as learners and as socially aware and active individuals, locally, nationally, and globally.

What We Do

Organize intentional and deliberate culturally specific outreach/and on-campus visits and recruitment activities. We also help new students orient and transition to OSU's campus.

Provide individual informal/formal mentoring and support, referral to services, and advocacy for personal, interpersonal, academic, career, cultural, spiritual development and success.

Develop, present, and coordinate educational programs for students contributing toward retention and success including academic counseling, personal, social, interpersonal, cultural, career issues; leadership and professional development; organization development; intercultural effectiveness, community service, and social justice. We also engage in consultation and teaching.

AMERICAN INDIAN INITIATIVES

Allison Davis-White Eyes, Director
Intercultural Student Services
A150E Kerr Administration Building
541-737-4383
Website: <http://oregonstate.edu/dept/indian/>

The American Indian Initiatives office is charged with the central goal of building the capacity and potential of American Indian students and American Indian communities. To that end, the Office of American Indian Initiatives is responsible for the management of collaborative efforts between Oregon State University, American Indian student organizations, the Nine Sovereigns of the state of Oregon, and National American Indian Education organizations as well as Tribal Colleges.

In consultation with the statewide Oregon Tribal Education Contractors, and the vice provost of Student Affairs, the Office of American Indian Initiatives is also charged with the following:

Developing and implementing strategic plans for the recruitment of American Indian students;

Creating and implementing specific programs and events to enhance the university's visibility in reservation communities;

Adhering to, and upgrading the management of tribal relationships, and memorandums of understanding that exist with the Nine Sovereigns of Oregon as pursuant to Executive Order #EO-96-30;

Maintaining liaisons with other campus programs and units, community groups, regional and national Indian organizations;

Serving as the central access point for on-campus programs,

Tribal education contractors, prospective students and parents, and others seeking information or services on or for American Indian students.

In addition, the office determines campus policy in collaboration with other academic and administrative units on campus.

ASIAN & PACIFIC ISLANDER AMERICAN STUDENT SERVICES

Intercultural Student Services
A150 Kerr Administration Bldg.
541-737-9033
Website: <http://oregonstate.edu/dept/apia/>

The APIA Student Services Office focuses on the access, retention, and success of Asian and Pacific Islander American students with multiple identities that include race, ethnicity, gender, sexual orientation, etc. Access programming includes hosting of on campus and off campus events for pre-college students. Assessment, assistance, and/or referral are made for issues negatively impacting retention. Focus is on making better choices, learning survival skills for thriving, becoming academic leaders, and managing the challenges. Written, verbal, and emotional support and advocacy is provided to increase retention regarding academics, financial aid, race/ethnicity/gender, cultural, and professional advancement.

Advises and collaborates with student organizations, e.g., the Asian and Pacific American Council (Asian and Pacific Cultural Center, Asian and Pacific American Student Union, Cambodian Student Association, EPIC, Hui O Hawaii, Hula Club, Delta Phi Omega, HMONG OSU, Isang Bansang Pilipino, Japanese American Students Association, Korean Students Association, Polynesian Cultural Club, Sigma Beta Rho, and the Vietnamese Students Association) to celebrate

diversity and to organize events and activities that provide social support and aids in the transition, retention, and success of students. Events include APA Connect, A&PIA Leaders Connecting, APA Heritage Month, API Welcome Reception, End of the Year Celebration of Graduates and Leaders, etc. Provides training and development in leadership, organization skills, and community networking; and regarding academic, personal, social and cultural issues.

CASA LATINA/O DE OSU
Oscar Humberto Montemayor,
Director

Intercultural Student Services
 A150 Kerr Administration Bldg.
 541-737-9031
 Website: <http://oregonstate.edu/dept/casa/>

CASA is responsible for the administration, management and operation of the CASA Latina/o de OSU to increase the recruitment, retention, student development, academic performance and graduation of students of Latina/o, Hispanic, and/or Chicana/o heritage. Develop and coordinate the recruitment of Latina/o, Hispanic, and Chicana/o students by the CASA Latina/o de OSU. Establish and maintain Latina/o, Hispanic, and Chicana/o community alliances and other communication venues to access the Oregon and Northwest Latina/o, Hispanic, and Chicana/o community.

CASA leads community-building efforts, works collaboratively with student leaders, faculty, staff, and community to carry out the vision of CASA Latina/o de OSU, the Intercultural Student Services Department, Student Affairs, and Oregon State University. CASA develops educational and cultural education programming collaborating with and to students, the OSU campus, and the surrounding communities.

CROSS-CULTURAL MENTORING PROGRAM
Charlene Martinez, *Director*

Intercultural Student Services
 charlene.martinez@oregonstate.edu
 Website: <http://oregonstate.edu/dept/iss/mentoring>

The purpose of the Cross-Cultural Mentoring Program is to develop the cross-cultural awareness and social justice education skills and capacities of mentees and mentors through a year-long process.

The Cross-Cultural Mentoring Program will help participants learn to:

- Enhance understanding of one's own dimensions of identity
- Increase vocabulary, awareness, and skills, around issues of social justice education
- Recognize and challenge personal biases and prejudices

- Create and communicate a personal vision for being an ally
- Create healthier relationships that value, recognize, and celebrate difference
- Engage in authentic conversations

As a program, we value:

- Experiential learning
- Inclusive and braver spaces
- Self-reflection and discovery
- Positive social change
- Personal transformation and growth
- Building community

Participation includes mentor training, institutes on special topics, periodic workshops, and leadership support. If you are interested in being a mentor or mentee, or if you would like more information, please contact Charlene Martinez at charlene.martinez@oregonstate.edu.

DIVERSITY DEVELOPMENT

Intercultural Student Services
 129 Snell Hall/MU East
 541-737-6370

diversity.office@oregonstate.edu
 Website: <http://oregonstate.edu/diversitydevelopment/>

Diversity Development coordinates safe environments in which students can share their multiple identities, and learn about issues of culture, heritage, history, identity, and self-expression in an atmosphere of positive engagement and mutual respect. The office is dedicated to fostering an inclusive community at OSU that is committed to social justice and liberation for all people, regardless of racial/ethnic background, gender, sexual orientation, religion, socioeconomic class, age, and/or physical abilities. Diversity Development manages SOL and the four cultural centers: the Asian & Pacific Cultural Center, the Lonnie B. Harris Black Cultural Center, the Centro Cultural César Chávez, and the Native American Longhouse. The centers provide support services to students, leadership development, as well as opportunities for all members of the OSU community to learn about different cultures and communities in a safe environment. Events and activities at the four centers include national history and heritage month programs, social justice workshops, cultural holiday celebrations, mentoring opportunities, and many other programs. Everyone is welcome to visit!

- **Asian & Pacific Cultural Center**
 2638 NW Jackson St.
 Corvallis, OR 97333
 541-737-6361
apcc@oregonstate.edu
- **Lonnie B. Harris Black Cultural Center**
 2320 NW Monroe St.
 Corvallis, OR 97333

541-737-4372
bcc@oregonstate.edu

- **Centro Cultural César Chávez**
 1969 NW A St.
 Corvallis, OR 97333
 541-737-3790
CCCC@oregonstate.edu
- **Native American Longhouse**
 311 SW 26th St.
 Corvallis, OR 97333
 541-737-2738
nal@oregonstate.edu
- **SOL: LGBT Multicultural Support Network (shared office with the Pride Center)**
 1553 SW A Ave.
 Corvallis, OR 97333
 541-737-9969
SOL@oregonstate.edu

OFFICES OF LGBT SERVICES
Jeff Kenney, *Coordinator*

Intercultural Student Services
 149 Snell Hall
 541-737-6342
 Website: <http://oregonstate.edu/lgbtqqia/>

The Office of LGBT Services supports Oregon State University in meeting the specific academic, social, and cultural needs of Lesbian, Gay, Bisexual, Trans, Queer, Questioning, Intersex, Asexual, and Allied (LGBTQQIAA) students, prospective and current. Retention of LGBTQQIAA students is the primary goal of the Office of LGBT Services. Promoting campus-based groups that educate and raise awareness about sexual and affectional orientation and identities is an essential component of the program. Equally important is the goal of fostering relationships within Corvallis and across surrounding communities to help build relationships through which LGBTQQIAA students can thrive as they pursue future educational, career, and life goals.

The Office of LGBT Services works to empower all students by fostering opportunities to think critically, receive information, share knowledge and to sustain an educational environment in which each student has the support needed to shape unique identities. Growth is a natural progression of curricular and co-curricular experiences and the Office of LGBT Services assists students with such growth processes through mentoring, advising, interaction and commitment.

UJIMA EDUCATION OFFICE
Earlean Wilson Huey, *Director*

Intercultural Student Services
 A150G Kerr Administration Building
 541-737-9032
 Website: <http://oregonstate.edu/dept/ujima/>

The Ujima Education Office provides African centered programming that is designed to meet the specific academic,

social, and cultural needs of African/African American students, prospective and current. Retention is the heart of Ujima, while recruitment is the natural extension. The Ujima Office works to empower students by giving them the opportunities to think critically, receive information, and share knowledge. Our staff aims to build a strong cohort of student leaders within the Black community and serves as advisor to student groups and organizations, creates opportunities for increasing leadership development, and assists groups with program development, implementation, and conflict resolution. Additionally, written, verbal, and emotional support and advocacy is provided to increase retention regarding academics, financial aid, race/ethnicity/gender, cultural, and professional advancement. Lastly, the staff conduct outreach programs for middle and high school students in the community.

WOMEN'S CENTER

Mirabelle Fernandes Paul, *Director*

Intercultural Student Services

Benton Annex

541-737-1330

Email: mirabelle.fernandes-paul@oregonstate.edu

Website: <http://oregonstate.edu/womenscenter/>

Come and visit the friendly staff at the Women's Center for information on resources for women students, connection to multicultural resources, and support on a wide variety of topics. We strive to be an inclusive, collaborative, and accountable student services organization and serve a diverse group of students and student issues. Our goal is to provide information, referrals, advocacy, support, programs, resources, and mentoring relationships for the women of OSU and the community. The educational programs provided by the Women's Center reflect the diverse views of women from all walks of life and all identities. The Women's Center coordinates many workshops and opportunities for students, staff, faculty, and community members to present information about women's lives, challenges and opportunities for social justice.

Internships and volunteer opportunities are available for both undergraduates and graduate students. Over 1,400 books are available in our library for checkout to students, staff and faculty; and current periodicals and reference books are available for on-site use. There is a full kitchen, dining area, and computer lab available for use anytime between 8 a.m. and 6 p.m. during the week; meeting space can be reserved for groups of up to 25 during business hours.

LECTURES

Frequent public lectures by faculty members, visiting scholars, and persons prominent in national affairs supplement the regular curriculum. Campus sponsors of lectures include the Y-Round Table, Associated Students, Memorial Union Program Council, Sigma Xi, and others.

MEMORIAL UNION PROGRAMS AND SERVICES

MEMORIAL UNION AND MEMORIAL UNION EAST

Michael Henthorne, *Director*

112 Memorial Union

541-737-6256

michael.henthorne@oregonstate.edu

Website: <http://mu.oregonstate.edu/>

The Memorial Union, located in the heart of campus, is the community center of the university. It provides services, facilities, and programs to meet the varied social, recreational, and cultural needs of OSU students, faculty, staff, alumni, and campus guests.

The building provides five restaurants, a coffee shop, and banquet facilities, a bookstore, recreation area including billiards and bowling; music practice rooms, ballroom, post office, art gallery; lounges, the Joyce Powell Leadership Center and meeting rooms of all types.

The president of the Memorial Union is a student; other students share actively in its management and in organizing social, recreational, and cultural programs, including the Memorial Union Program Council, a student-led programming board.

The Memorial Union houses the office of the Department of Student Leadership and Involvement, which supports OSU students in organizational and leadership development. Under the Department of Student Leadership and Involvement are Student Activities, Club and Organization Development, Greek Life, and Leadership Education and Development (LEAD).

The Memorial Union East (MU East, Snell Hall) houses the student governing body, the Associated Students of OSU, and staff who provide support to the Department of Student Leadership and Involvement, as well as financial advising for student groups. MU East also provides a communication center for student broadcast and publications media, meeting rooms, and a craft center.

The Memorial Union buildings stand as constant reminders of this nation's struggle for peace and as living memorials to Oregon Staters who have given their lives in the service of their country.

MEMORIAL UNION PROGRAM COUNCIL

Linda Howard, *Program Advisor*

103 Memorial Union

541-737-6872 (MUPC), Front Desk

Information

Linda.howard@oregonstate.edu

541-737-1369

Website: <http://mu.oregonstate.edu/mupc/>

The Memorial Union Program Council (MUPC) is a student-led, student-driven organization that plans and produces high-quality, large-scale events for the OSU community. MUPC is committed to serving the OSU community by upholding traditions and creating co-curricular social, educational and recreational programs that are inclusive, accessible and entertaining.

Programs are intended to create community, make memories, and enhance the college experience.

This is achieved through many traditional events such as "Moms and Family Weekend," "Dads and Family Weekend," "OSU Has Talent," "Battle of the Bands," "Dam Jam," "Western Wind Up" and more.

MUPC also programs a variety of new events.

NEW STUDENT PROGRAMS AND FAMILY OUTREACH

Kris Winter, *Assistant Dean of Student Life*

kris.winter@oregonstate.edu

Leslee Mayers, *Associate Director*

leslee.mayers@oregonstate.edu

Ruth Sterner, *First-Year Experience Coordinator*

ruth.sterner@oregonstate.edu

Remi Nagata, *Orientation Coordinator*

remi.nagata@oregonstate.edu

B009 Kerr Administration

541-737-7627

Website: <http://oregonstate.edu/newstudents/home/>

First Year Student Website: <http://oregonstate.edu/main/firstyear>

New Student Programs & Family Outreach supports the college transition process with educational programs and outreach for new OSU students and their families. New Student Programs & Family Outreach coordinates new student orientations (START) and welcome activities (CONNECT), as well as parent/family outreach through orientations, events, websites and the OSU Parent & Family Association. New Student Programs & Family Outreach also coordinates U-Engage courses, 2-credit classes available to any new OSU student. U-Engage

classes give students the opportunity to get to know faculty and students with similar academic interests in small class settings. In addition, students gain an understanding of campus resources and tips on how to successfully complete their transition to OSU.

OFFICE OF EQUITY AND INCLUSION

Angelo Gomez, *Executive Director*
angelo.gomez@oregonstate.edu
541-737-0869

Anne Gillies, *Senior Affirmative Action and Advancement Associate*
anne.gillies@oregonstate.edu
541-737-0865

Jennifer Almquist, *Associate Director*
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541-737-0866

Roni Sue, *Senior Title IX Response and Prevention Associate*
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541-737-0868

Gabriel Merrell, *Senior Accessibility and Deputy ADA Coordinator*
gabriel.merrell@oregonstate.edu
541-737-3671

Scott Etherton, *Equity Associate*
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541-737-0581

Kerry McQuillin, *Compliance and Assessment Associate*
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541-737-4381

Kerstin Colón, *Office Coordinator*
kerstin.colon@oregonstate.edu
541-737-6368

Office of Equity and Inclusion
327/330 Snell Hall
Oregon State University
Corvallis, OR 97331
541-737-3556
541-737-8232 FAX
Email: oei@oregonstate.edu
Website: <http://oregonstate.edu/oei/>
Accessibility Website: <http://oregonstate.edu/accessibility/>

Principles

The Office of Equity and Inclusion is committed to success for the entire campus community through equality, fairness, and understanding. Our work is guided by three principles:

- **Equity**—Ensuring equality of opportunity in all that we do. We strive to ensure equality in terms of the opportunity to become a member of the Oregon State University learning and working community; in one's opportunity to participate in and contribute to the work; in one's opportunity to participate in and benefit from the programs, services,

and activities; and in terms of the communities of the state that are served by the university.

- **Inclusion**—Welcoming, valuing, and seeking to understand the experiences of everyone with whom we interface. We create and sustain this environment through interpersonal interactions that explicitly support and affirm the inherent dignity and uniqueness of individuals and communities, and through institutional efforts that address systemic barriers to inclusion.
- **Diversity**—Recognizing that a diversity of people, perspectives, experiences, and thought is essential to a compelling research, scholarship, and learning environment. We aim to develop policies and practices that promote and enhance diversity in all university endeavors, striving to benefit maximally from our different ideas, perspectives, and ways of being, knowing, and doing.

Expertise and Leadership

In service to both Oregon State University and the broader community, the Office of Equity and Inclusion provides expertise and leadership in the following areas:

- Engaging in community development, including creating, leading, and supporting opportunities for involvement with an array of equity and inclusion efforts.
- Partnering with a range of individuals and groups to develop and deliver programs, initiatives, and resources related to campus-wide diversity and social justices issues.
- Working to eliminate barriers to achievement for individuals and groups historically underrepresented in higher education.
- Managing the university's affirmative action and equal opportunity efforts.
- Responding to discrimination complaints through investigation and resolution.
- Providing advice and assistance to individuals who believe they have experienced bias or discrimination.
- Promoting understanding about affirmative action, equal opportunity, diversity, and inclusion.
- Coordinating access and accommodation in accordance with the Americans with Disabilities Act.
- Offering education and training on a variety of topics related to equity and inclusion.
- Assisting individuals and offices or units who would like guidance in areas such as search and selection, inclusive working and learning environments, and policy and best practices development.

OSU CRAFT CENTER

Susan Bourque, *Manager*
112 Memorial Union
541-737-2937 Front Desk Information
craftcenter@oregonstate.edu
susan.bourque@oregonstate.edu
541-737-6371
Website: <http://mu.oregonstate.edu/craftcenter/>

Engage your creativity at the OSU Craft Center...a dynamic, user-supported arts and crafts studio. With its hands-on, friendly and casual environment, it's a great place to take a creative time out from the whirlwind of life. Open seven days per week, the craft center offers studio workspaces, late night programming and a wide variety of classes and workshops for the beginning to experienced artist/craftsperson.

The OSU Craft Center will be relocation to a new facility—the Student Experience Center (SEC), starting Winter term 2015. Be sure to come check out our new space!

Facilities include fully equipped studios in ceramics; digital photography; fine woodworking; stained glass, fused glass and glass torchwork; fibers and sewing, silkscreen and weaving; jewelry/metalwork; plus other mixed media crafts and lots of room to work. Power and hand tools are available for use in all the craft areas. The center also operates a promotional button-making business.

Each term, over 35 non-credit classes and workshops are offered. Taught by skilled local artisans, classes focus on non-competitive learning; their small size enables students to receive individual attention. Open studio memberships are also available for those with prior experience who are interested in using the center's studio areas tools and equipment for projects and exploration. Catalogs with current class offerings are located each term around campus, at the Craft Center, or by calling 541-737-2937. Located on the ground floor of MU East/Snell Hall through Fall term 2014, then relocating to the basement level of the SEC. The OSU Craft Center's hours of operation follow the OSU academic calendar.

RECREATIONAL SPORTS

541-737-3748

Website: <http://oregonstate.edu/recsports/>

Student fee-funded Recreational Sports programs and facilities at Oregon State University are coordinated and administered by the Board of Recreational Sports.

Recreation Facilities

Registered students who have paid full incidental fees have access to Dixon Recreation Center, McAlexander Fieldhouse, and Student Legacy Park. **Dixon Recreation Center** includes Stevens Natatorium, the Adventure Leadership Institute, an Indoor Climbing Center, weight rooms, cardio equipment, multi-purpose rooms, an indoor track, and multiple gyms and courts. **McAlexander Fieldhouse** includes indoor turf, multi-sport courts, and an indoor climbing center.

Student Legacy Park includes turf fields, indoor and outdoor tennis courts, a track, basketball court, and outdoor pavilion. **Peavy Sports Fields** (grass) are commonly used for intramural play.

NOTE: Additional recreational facilities are available through the College of Public Health and Human Sciences: Langton Hall, Women's Gym, and golf practice areas.

Recreational Sports also rents facilities for large and small groups—camps, conference activities, events, etc. Learn more about available spaces, fees, and schedules at <http://oregonstate.edu/recsports/rentals>.

Recreation Services and Programs

The **Stevens Natatorium** includes an 8-lane, 25-yard lap pool, a deep-water pool, and a spa with an adjoining observation deck. Full-service locker rooms, equipment issue area, and a private changing room are also available. When the weather is nice there is also an outside sun deck. The natatorium accommodates recreational and fitness swimming, water fitness classes, springboard diving, and family swim times.

Sports and Special Programs provide students of all skill levels with educational, recreational, and competitive sport opportunities through student-led organizations and sport leagues and events.

Intramural sports offers over 35 individual, dual, and team sports including 5K walk/runs, badminton, basketball, billiards, bowling, dodgeball, flag football, golf, indoor baseball, kickball, pickle ball, racquetball, soccer, softball, swimming, tennis, track, ultimate disc, volleyball, water polo, wrestling, and others.

Sport clubs are available for student intercollegiate competition in badminton, baseball, bass fishing, cycling, disc golf, dodgeball, equestrian (dressage, drill, hunter-jumper, IHSA), gymnastics,

judo, karate, kendo, lacrosse, pistol, polo, racquetball, rifle, rugby, sailing, soccer, table tennis, tae kwon do, tennis, triathlon, ultimate disc, volleyball, water polo, and wheelchair basketball.

The **Adventure Leadership Institute** includes a variety of facilities, classes, programs, and services that support educational and leadership experiences outside the classroom. Special 'for-credit' classes are offered to provide the skills needed to lead trips or facilitate groups. Professional certificates can be obtained in these areas. Call 541-737-4341 to set-up an appointment with an advisor. The Adventure Leadership Institute is also the home of the Adventure Club, offering a variety of outdoor pursuits for the OSU community to join in throughout the year.

The **Challenge Course** offers six acres of low and high elements designed to actively engage your mind and body. Participants develop a greater understanding of communication and problem solving skills, as well as the people they live and work with through group challenge activities. This facility is open to students, faculty, and community groups. Highly trained instructors are on hand to assist all groups.

The **Dixon Climbing Center** provides over 7,000 square feet of climbing surface for climbers of all abilities. This 42-foot-tall facility has three types of wall surface and is equipped with several cracks for lead climbing. It also contains the world's only elevator-accessible rappel station. The **McAlexander Climbing Center** provides over 4,000 square feet of high performance climbing wall surface including a 60-foot-long bouldering wall. This wall is equipped with several instructional components such as a rappelling ledge, and a cliff-top training platform.

Fitness programs offer drop-in group fitness classes in activities such as zumba, indoor cycling, yoga, kickboxing, step, boot camp and group strength and resistance. Personal training and small-group training are available by appointment. Fitness hosts special events, presentations and workshops year-round and upon request. Appointments are available for fitness testing, personal training, and athletic training.

Safety programs are a campus resource for CPR and First Aid training, first aid kits and supplies, emergency response staffing for events, and safety awareness seminars.

For more information on recreational sports, visit the website at <http://oregonstate.edu/recsports/>.

STUDENT CONDUCT AND COMMUNITY STANDARDS

Carl Yeh, Director

B058 Kerr Administration Bldg.

541-737-3656

SCCS@oregonstate.edu

Website: <http://oregonstate.edu/studentconduct/home/>

Student Conduct and Community Standards serves as the central coordinating office for violations of University Student Conduct Regulations. The office acts on reports of possible violations from law enforcement, faculty and staff or others. The program provides conflict resolution support for students, faculty, and staff as well as staff training.

STUDENT EVENTS AND ACTIVITIES CENTER

Robin Ryan, Associate Director

Memorial Union 103

Robin.ryan@oregonstate.edu

541-737-2917

SEAC-MU 103

Website: Events.sli@oregonstate.edu

541-713-8368

The Student Events and Activities Center is the hub of support for recognized student organizations and all students that provide events and activities for the OSU community. The goal of the center is to provide visibility of all of the involvement opportunities that exist for OSU students; ranging from being a part of a student organization, participating in a university student-coordinated program, getting involved as a peer educator or participating in one of the hundreds of extracurricular programs available. In addition, the SEAC provides support to ISOSU and MUPC, cohost AFTER DARK@OSU, leads the #beBEAVERBOLD initiative and is the home for the MU Inclusivity Initiative and the Community and Cultural Food Program. Visit the SEAC to get involved, make a difference in the world, enhance your academic experience, discover yourself, make friends, have fun and Get Engaged in What Matters!

Contact: Danté L. Holloway, Coordinator, Coordinator Student Organizations, 541-737-1562; Linda Howard, Advisor-MUPC, 541-737-1369; Becky Evans, Cultural Program Coordinator, 541-737-0760; and Derek Rice, Community and Cultural Food Program, 541-737-0763.

STUDENT HEALTH SERVICES

Jennifer Haubenreiser, *Executive Director*

201 Plageman Building
541-737-9355

Email: jenny.haubenreiser@oregonstate.edu
Website: <http://studenthealth.oregonstate.edu/>

Appointments 541-737-WELL (9355)

Information/Nurse Advice Line
541-737-2724

Health Promotion Department
541-737-2775

Student Health Services@Dixon
541-737-7556

Student Health Services (SHS) at Oregon State provides leadership for health and wellness on campus to enhance student success while at OSU and throughout students' lifetimes. The SHS is accredited by the Accreditation Association for Ambulatory Health Care and is a member of the American College Health Association.

The SHS provides campus-wide comprehensive primary health care, disease prevention and treatment services, as well as extensive health promotion programs for all OSU students. Most services are housed in the Plageman Building on campus, which includes the medical center, lab, pharmacy and health promotion. Specialized services are available at the Dixon Recreation Center (SHS@Dixon). Expansion for a second clinic location starting in the Fall 2014 is underway.

General medical and health promotion services are available year round. During the academic year the medical center is open M–F, 9 a.m. to 6 p.m., and 10 a.m. to 3 p.m. on Saturdays. Hours and services vary during summer session, term breaks and on holidays. A telephone nurse information and advice line is available during clinic hours and after hours. More extensive clinic information and an online self-care guide is available at <http://studenthealth.oregonstate.edu/>.

Medical Services in the Plageman Building

Confidential and high-quality health care is provided by physicians, nurse practitioners, physician assistants, registered nurses, physical therapists and other health care professionals. Students are encouraged to become established with a primary care clinician early in their academic career. Clinical services include general medicine, women's health, sexual health, allergy/asthma, sports medicine, travel medicine, and psychiatry. Specialty consultations in dermatology, orthopedics, and endocrinology are available, as well as consultation with a Certified Diabetic Educator. Nutrition services and tobacco cessation counseling are also available, and the Oregon Contraceptive

Care (CCare) unit provides free contraceptive services to qualified students. SHS provides x-ray and laboratory services, and a full-service pharmacy, operated by the OSU College of Pharmacy, is located on the first floor of the building.

SHS@Dixon

SHS@Dixon provides services to treat activity-related injuries and other medical conditions and supports and promotes positive health behaviors. SHS staff provide physical therapy, sports medicine, massage therapy, nutrition consultation, acupuncture, chiropractic and health coaching services at Dixon Recreation Center. For appointments and information, please call 541-737-7556.

Health Promotion

The goal of the Health Promotion Department is to enable OSU students to gain knowledge and skills and to modify attitudes necessary for making healthy lifestyle choices and behavioral changes. Health Promotion offers a broad array of outreach programs on a variety of health issues most commonly identified as concerns or interests of students. Students are encouraged to participate in Peer Health Advocates, a student volunteer program, or Every1, a peer-based sexual violence prevention program. Individual consultations are also available for nutritional concerns, health coaching, tobacco cessation, and alcohol issues. Male Advocates for Responsible Sexuality (MARS) offers individual consultations to male students regarding sexual health and sexuality, as well as outreach programs.

Immunization and Medical History Requirements

Completion of the Medical Health History Form is required of all registered OSU students. Students are encouraged to satisfy all immunization requirements before arriving at OSU. Documentation of immunity against measles, mumps and rubella is required. Tuberculosis testing (*T-Spot*) is required for students arriving from certain countries and is available at the SHS. Students who are non-compliant with immunization requirements will have a hold placed on registration for classes. While not required, students are encouraged to be immunized against hepatitis A, hepatitis B, chicken pox, diphtheria/tetanus/pertussis, HPV (*genital wart virus*), and meningococcus. Appropriate travel immunizations are also recommended. Annual flu immunizations are offered to students, faculty and staff. For additional information call the Immunization Help Line at 541-737-7573.

Fees

Students pay a quarterly health fee that provides access to clinical office visits at no charge. Additional fees are charged to

see on-site medical specialists, laboratory tests, x-rays, certain procedures, and pharmacy. Charges for the most commonly used services are listed on the SHS website <http://studenthealth.oregonstate.edu/fees>. Any fees for service can be billed directly to the student's OSU account.

OSU Student Health Insurance

OSU sponsors insurance plans for students and their families. The OSU plan is coordinated between SHS and private insurance providers. Insured family members who are not OSU students are not eligible to be seen at SHS and are referred to private community providers. Students must pay the OSU health fee to be eligible to purchase the OSU Student Health Insurance. International students are required to enroll in an OSU Student Health Insurance plan or provide proof of comparable insurance. More information is available in the Insurance Office in the Plageman Building or by calling 541-737-7568.

STUDENT LEADERSHIP AND INVOLVEMENT, CLUBS, ORGANIZATIONS, ACTIVITIES

Eric N. Alexander, *Director*
541-737-8849

eric.alexander@oregonstate.edu
203 Memorial Union
541-737-8849

General SLI Information: 541-737-2101
Website: <http://oregonstate.edu/sli/>

Comprised of the **Center for Leadership Development**, the **Student Events and Activities Center**, the **Center for Fraternity and Sorority Life**, and the **Center for Civic Engagement**, the Department of Student Leadership and Involvement (SLI) provides programs, services and opportunities that intentionally promote student learning and growth in four critical areas: 1) Civic Engagement & Sustainability, 2) Community Building & Celebration, 3) Leadership Development, and 4) Global Perspective & Multiculturalism. See individual listings for information about each center.

SLI works in direct support of the following Student-Coordinated Programs: Coalition for Community Dialogue, International Students of OSU (ISOSU), the Memorial Union Program Council (MUPC), and the Student Sustainability Initiative (SSI); and indirectly with other groups, including ASOSU and the Cultural Resource Centers. See individual listings for information about each program.

Additionally, SLI supports OSU Recognized Student Organizations with leadership, organizational development

and activity/event planning, including events through the Cultural Meal Support program.

STUDENT MEDIA

Julia Sandidge, *Director*

Kami Hammerschmith, *Assistant Director of Student Media*

118 MU East
541-737-4615

Email: julia.sandidge@oregonstate.edu

The Daily Barometer

Oregon State University's student newspaper is distributed throughout the campus and community each weekday during the school year and once a week in the summer. Its student editors determine news and editorial content and direct the staff in reporting, writing, and editing assignments. Offices are located on the first floor of MU East (Snell Hall). Newsroom, 541-737-2231. Advertising, 541-737-2233. Website: <http://www.dailybarometer.com/>.

Beaver Yearbook

The Beaver Yearbook reviews the people and events that make the academic year memorable. It is under the direction of student editors who determine its policy and content.

The yearbook may be ordered throughout the year and is available for pickup in Student Leadership and Involvement in the fall. Students who will not be on campus when the yearbooks are distributed may pay a mailing and handling fee at the Student Media Office, 541-737-3374. Website: <http://oregonstate.edu/yearbook>.

KBVR FM Radio

Oregon State University's on-campus radio station gives students an opportunity to gain experience in live radio broadcasting. Featuring high quality public affairs programming and alternative music, the station can be found on the dial at 88.7 FM. Offices are located on the second floor of MU East (Snell Hall), 541-737-6323. Website: <http://kbvr.com/>.

KBVR TV

A fully equipped television studio, editing facility and remote gear afford students practical training in television production. Programming includes a wide variety of locally produced shows plus the nightly news, live music programs, live coverage of OSU sporting events, game shows, comedy, movies, public affairs interviews and documentaries. KBVR TV can be seen on cable channel 26 in Corvallis, Albany and Philomath. Offices are located on the second floor of MU East (Snell Hall), 541-737-3522. Website: <http://kbvr.com/>.

Prism

Prism, OSU's art and literary magazine, is published three times per year by

students at Oregon State University. Prism welcomes contributions from OSU students in the form of photography, art, poetry, and short stories. Contact the Prism Office for more information, 541-737-2253. Website: <http://oregonstate.edu/prismmagazine/>.

STUDENT SUPPORT SERVICES (TRIO)

Roberto Casarez, *Director*

325 Waldo Hall
541-737-9326

Website: <http://oregonstate.edu/dept/sss/>

Student Support Services (SSS) is a federal TRiO program, funded by the U.S. Department of Education, with the intent of providing assistance to low-income, first generation (neither of whose parents graduated from a four-year institution), and students with a learning or physical disability. SSS is able to provide academic counseling, peer mentoring, tutoring, and cultural enrichment opportunities for students who qualify for the program. In addition, financial assistance is available to students who meet certain additional criteria.

STUDENT SUSTAINABILITY INITIATIVE AND CENTER

Olivia Poblacion, *Director*

Jen Christion Myers, *Advisor*

Jen.ChristionMyers@oregonstate.edu
738 SW 15th St.

Corvallis, OR 97333

541-753-4072

Email: ssi@oregonstate.edu

Website: <http://oregonstate.edu/ssi/>

The Student Sustainability Initiative (SSI) is a student fee-funded, student-led organization, whose mission is to create a culture of sustainability at OSU through opportunity, education, and action. The SSI strives to address all three pillars of sustainability: environmental, social, and economic.

Objectives:

- Increase understanding of the need for a sustainable culture
- Develop students' capacities to organize sustainability projects and campaigns
- Encourage and support students in furthering their own vision of sustainability on campus
- Connect organizations on campus and the Corvallis community
- Advocate for stronger institutional commitments to sustainability

These objectives are implemented through:

- Education, actions and campaigns to raise awareness and improve

sustainability on campus

- Student leadership opportunities
- Sustainability grants program
- Information about opportunities and resources

The OSU Student Sustainability Center (SSC) houses the Student Sustainability Initiative (SSI) and is a place for sustainability-minded individuals and groups to network and exchange ideas. The site features an organic garden and permaculture site, solar trailer, and resource library. The SSC is located at 738 SW 15th St. on the southeast edge of campus. Office hours are 11 a.m. to 5 p.m., Monday through Friday during the school year.

If you would like to get involved, visit the SSI's website, check out their Facebook page (<http://www.facebook.com/osussi>), follow them on Twitter (<http://twitter.com/#!/osussi>), e-mail them, or drop by the SSC.

UNIVERSITY HOUSING AND DINING SERVICES

Dan Larson, *Executive Director*

Teresita Alvarez-Cortez, *Associate Director-Diversity Initiatives and Programs*

Steve Hoelscher, *Associate Director-Finance and Business Services*

Ann Marie Klotz, *Associate Director-Residential Education*

Kerry Paterson, *Director-Residential Dining and Catering*

Patrick Robinson, *Associate Director-Facilities*

Brian Stroup, *Associate Director-Operations*

Jennifer Viña, *Associate Director-Marketing and Communications*

102 Buxton (Jefferson Street entrance)
Oregon State University

Corvallis, OR 97331

541-737-4771

Website: <http://oregonstate.edu/uhrs/>

The Department of University Housing and Dining Services (UHDS) provides a diverse selection of housing and dining alternatives—university-owned student cooperatives, residence halls, and student family housing—all of which offer a variety of programs and services.

Oregon State University recognizes the impact the living environment has upon student life. This environment, whether on or off campus, is an important part of the student's education experience. The university is committed to providing all students in the residential setting an integrated program for social, cultural, and educational development beyond the classroom.

First-year students are required to live on campus their first academic year at OSU. It is easier for students to make

friends and adjust to university life if they live on campus for a year or two. Academic indicators have shown that students who live on campus typically do better academically and are more likely to continue their education.

University Housing and Dining Services' main goals are to help students succeed academically, become active citizens of their communities, and to enrich and enjoy their university experience. Through the Department of University Housing and Dining Services, students can make arrangements for meals and accommodations, consult with residential education staff, bring suggestions for improvements, and receive assistance on their concerns and interests. Emphasis is upon helping students achieve academic success and providing comfortable, safe, reasonably priced living accommodations and programs.

Residence Halls

Through its 15 residence halls, the university offers a variety of living environments, including special program halls, designated quiet floors, coeducational facilities, and substance-free housing and an academic success program focus with faculty-in-residence. More details about the living communities can be found at <http://oregonstate.edu/uahds/halls>.

Most student rooms are designed for double occupancy. A limited number of single rooms are available in each hall. All residence halls are smoke-free.

The residence hall dining program features an a la carte meal service, with services offered in Marketplace West, McNary Central, and Arnold Dining Centers, Bing's Café located in Weatherford Residential College, as well as Cascadia Market and Peet's Coffee & Tea in the International Living Learning Center. Residential students have a choice of flexible meal plans, which can be used in any of the UHDS operated dining facilities and cafes. They can also participate in the Orange Rewards program, which allows them to eat in all 27 campus dining venues.

For more detailed descriptions of residence halls, please visit the University Housing and Dining Services' website at <http://oregonstate.edu/uahds/>.

Residence Hall Application

Once admitted to OSU, students submit an online application for university-owned residence halls at <http://oregonstate.edu/uahds>. Flexible academic year contracts are available to all students. Comprehensive UHDS information packets titled Life on Campus are emailed out to all admitted students or are available from the Department of University Housing and Dining Services, 541-737-4771.

Residence Hall Rates

Note: The figures listed below are estimated room and meal rates for 2014–

2015. When established, the new rates will be available through the Department of University Housing and Dining Services.

Residence Halls

Estimated rates listed are for the academic year; room and meal package rates will vary by type of meal plan chosen.

Double room with preferred meal plan (including \$100 Orange Rewards):

\$9,900–\$12,300

There is an additional fee for single room.

All Oregon State University residence halls and dining facilities are built and operated entirely with income from resident students and summer conferences and camps. No state tax funds are used.

University Housing for Student Families (All Terms)

Oregon State University maintains 107 unfurnished apartments in Orchard Court for student families. Rentals start at approximately \$525 a month with water, garbage, and TV cable service furnished. Students should apply to the Department of University Housing and Dining Services. Additional information is available at: <http://oregonstate.edu/uahds/family-housing>.

Housing in Summer Session

Summer Session housing is available for short or long-term stays. Additional information is available at: <http://oregonstate.edu/uahds/summer>.

Off-Campus Housing

Current bulletin board listings for a variety of rentals available in Corvallis and surrounding communities are located in the Memorial Union lower concourse. A copy of the Renter's Guide may be obtained upon request from The Daily Barometer office, 118 MU East, Corvallis, OR 97331.

UNIVERSITY OMBUDS

Sue Theiss, Ombuds
sue.theiss@oregonstate.edu

Breanne Taylor, Associate Ombuds
breanne.taylor@oregonstate.edu
University Ombuds
Waldo Hall 116

Oregon State University
Corvallis, OR 97331
541-737-7029
Website: <http://oregonstate.edu/ombuds/>

The University Ombuds strengthens campus communication and administrative processes by acting as a designated neutral referral resource and dispute resolution practitioner. The ombuds' major function is to provide informal, impartial, and confidential* assistance to the university community by listening to concerns, clarifying issues, exploring options for resolution, providing infor-

mation and referrals, and if all parties agree, facilitating informal, non-binding mediation. The ombuds also reports anonymous trend data to the president and provides periodic conflict management trainings to all members of the campus community.

Serving as a designated neutral, the ombuds is not an advocate for any individual or for the university, but rather acts as an advocate for fairness and healthy campus conflict management. The ombuds does not have the power to make any decisions as to ultimate resolution, nor does the ombuds have the power to reverse any decisions made or actions taken by the regularly constituted university authorities. The ombuds does not provide legal advice or psychological counseling. This position compliments, but does not replace, the university's existing resources for conflict resolution. To preserve independence and neutrality, the ombuds reports directly to the president.

**Confidentiality cannot be promised in matters relating to threats to public safety, child abuse, if there is imminent risk of serious harm, or if compelled by a court of law. Speaking with an ombuds does not constitute legal notice to the university of any problem, concern, or complaint. You must pursue alternative complaint avenues if you wish to obligate the university to respond in any way. The ombuds has no duty or responsibility to report incidents to any person or authority, other than as described above.*

UNIVERSITY THEATRE

George Caldwell, Coordinator
541-737-2853
george.caldwell@oregonstate.edu
Website: <http://oregonstate.edu/dept/theatre/>

University Theatre, continuing a tradition of more than 100 years of public performances in Corvallis, offers all students involvement in the theatre creative process. Each season, three main stage and numerous studio and classroom productions give student actors, designers and technicians ample opportunity to develop as theatre artists and craftspeople.

For several years, the University Theatre, with the support of the Memorial Union and Summer Session, has produced "Bard in the Quad," summer outdoor performances of Shakespeare on the MU Quad. Auditions and crew assignments for the University Theatre are open to all students, no matter what their major. Students can also earn academic credit for participation on stage and behind the scenes.

VETERAN RESOURCES

Gus Bedwell, *Veterans Resources Coordinator*

B102 Kerr Admin. Bldg.
Oregon State University
541-737-7662

Email: gus.bedwell@oregonstate.edu
Website: <http://oregonstate.edu/veterans/home/>

PROGRESS STANDARDS FOR VETERAN STUDENTS

Programs at Oregon State University are approved for the use of VA benefits under the Montgomery GI Bill, Dependents Educational Assistance, and Title 38 and Title 10 of the US Code, or benefits offered by the State of Oregon Department of Veteran Affairs. The university, through the Registrar's Office, provides the certifying service to qualified students. The certifying official issues enrollment certification documents to the appropriate VA regional office and monitors students' satisfactory progress for the VA. Students wishing veterans counseling or other services must address the Veterans Administration directly.

1. OSU students who receive benefits from the Veterans Benefits Administration of the Department of Veterans Affairs are subject to the satisfactory progress standards as set forth in Chapter 38, U.S. Code sections 1674, 1724, 1775, and 1776, and to those defined by the university in **Academic Regulation 22, Satisfactory Academic Standing**:

Oregon State University expects students to maintain satisfactory academic progress toward degree completion. At the conclusion of each term, grade-point averages are calculated and academic standings determined for students seeking a baccalaureate degree according to the criteria outlined below. Students whose standings evidence a lack of satisfactory progress will be warned of this condition and advised to seek help from their academic advisors.

a. Academic Warning: Students with a term GPA below 2.0 will be placed on Academic Warning.

b. Academic Probation: Students who have attempted 24 or more credits at OSU and have an OSU cumulative GPA below 2.0 will be placed on Academic Probation. Students who attain a cumulative GPA of 2.0 or better are removed from Academic Probation.

c. Academic Suspension: Students who are on Academic Probation and have a subsequent term GPA below 2.0 will be placed on Academic Suspension. Academic

suspension is recorded on the student's academic record. Students who are academically suspended are denied all the privileges of the institution and of all organizations in any way connected to it, including any university-recognized living group.

d. Reinstatement to the University:

Suspended students will be considered for reinstatement to the university after two years or completion of a minimum of 24 quarter credits of transferable college-level work at an accredited college or university, with a GPA of 2.5 or above.

2. Students, who are placed on probation by the university, also will be notified that they are on probation insofar as Veterans Affairs' progress standards are concerned. If a student's deficiency is not corrected and they subsequently are placed on academic suspension, the university will notify Veterans Affairs of his or her unsatisfactory progress.
3. The university will recertify students who are suspended by the university and subsequently reinstated by the Academic Standing Committee.
4. Students dismissed from the university for unsatisfactory conduct will be reported as making unsatisfactory progress. The university will recertify the student only upon rescission of the dismissal by the university.

VETERAN RESOURCES COORDINATOR

The Veteran Resources Coordinator (VRC) helps veterans and eligible dependents at Oregon State University find, utilize, and in some cases apply for applicable state and federal VA education benefits. In addition to helping with educational benefits, the VRC can also help veterans and their dependents tap into other non-education related VA benefits (e.g. disability compensation, VA Medical, Employment, and Homeless Veterans Reintegration Programs). In addition, the VRC can provide information to active duty military personnel on benefits they can access while in the service that will have a positive impact on their transition into civilian life down the road (e.g. Vet Centers, VA Medical Facilities, Tricare/Triwest questions, the VA claims process, etc).

Contact Veteran Services Advisor Gus Bedwell at gus.bedwell@oregonstate.edu.

VA CERTIFYING OFFICIAL

The VA Certifying Official (VACO) certifies the enrollment of veterans and eligible dependents at Oregon State University. All veterans and eligible dependents, whether new, returning, or

transfer students, who expect to receive educational benefits from the Veterans Administration must notify the VACO in the Registrar's Office. For questions about benefits, contact veterans@oregonstate.edu.

The VA Certifying Official also monitors and reports to the Veterans Administration the Satisfactory Progress Standards for students who are receiving VA education benefits. See Progress Standards for Veteran Students for more information.

VETERANS TUITION ASSISTANCE PROGRAM

The Veterans Affairs Certifying Officials (VACO) at Oregon State University are the direct contact points for students using the Veterans Tuition Assistance Program. VACOs process students' tuition assistance authorizations and contracts and forward copies to OSU Business Affairs for billing the military branches. Depending on the branch of the military, requirements vary on how grades are reported. Grade reporting is done at the end of each academic term.

For questions about the Veterans Tuition Assistance Program, contact veterans@oregonstate.edu.

STATE EDUCATION AID

The state of Oregon has an educational aid program available to Oregon veterans who meet eligibility requirements. The state benefit may not be received for training for benefits which the veteran currently is receiving under the federal GI Bill and Voc Rehab. Information about the Oregon aid program may be obtained from the Department of Veterans Affairs, Education Section, 700 Summer St., NE, Salem, OR 97301-1285, 503-373-2000 or 800-828-8801. Additional information may be obtained from the website at <http://www.oregon.gov/odva/BENEFITS>.

VETERAN AND U.S. MILITARY SERVICE RECOGNITION CORD

Recognition of U.S. Military Service

Oregon State University recognizes the significant contribution and sacrifices made by OSU students who are U.S. military service members and veterans. Students may receive a red, white, and blue Military Service Recognition Cord to be worn at commencement.

To apply for the recognition, students should complete the OSU Military Service Recognition application which is available on the OSU Veterans website at <http://oregonstate.edu/veterans/home/>. Applications are to be submitted to the Veterans Resource Coordinator who will approve the application and distribute the recognition cord.

UNDERGRADUATE PLANNED EDUCATIONAL LEAVE PROGRAM

The Undergraduate Planned Educational Leave Program (PELP) is a voluntary, temporary, planned interruption or pause in a student's regular, full-time education. Its purpose is to enhance an undergraduate student's prospect of successful completion of their academic program. The PELP provides one opportunity¹ for a student to arrange a voluntary absence for as many as six consecutive regular academic terms (not including the summer terms). The PELP is designed to allow a student to pursue other activities that will assist them in clarifying their educational goals, such as job opportunities and experiences away from campus, military deployment, time to resolve personal or medical problems, or other similar pursuits. The PELP allows an undergraduate student to temporarily suspend their academic work for a period of time (in accordance with AR 13a, 13b, and 13c), and resume their studies with minimal procedural difficulties. The PELP \$25 non-refundable application fee allows an undergraduate student to maintain their official standing as a student at OSU and reserves the student's right to keep their original academic catalog² active during their absence. Beginning with the 2011–2012 academic year, all OSU undergraduate students³ are eligible to request leave through the PELP. The university reserves the right to consider a student's current academic standing and any existing student conduct issues prior to approving the voluntary PELP leave request. Students who withdraw from OSU prior to the 2011–2012 academic year and who are away from campus for four or more consecutive regular academic terms (not including summer terms) must re-enroll with OSU to re-establish their relationship as an OSU student and their academic catalog will be reset to the academic year they return to OSU.

Transcript Notation

A notation of the dates of any approved leave will be indicated on each student's official transcript.

Footnotes:

- ¹ Military deployments are an exception to this limitation. All military personnel who are deployed for military service may submit a voluntary leave request for each deployment.
- ² In accordance with the university's catalog policy on the inside cover of the General Catalog.
- ³ The PELP began with the 2011–2012 academic year (Summer 2011). Any former OSU students who attended OSU prior to the 2011–2012 academic year and have been absent for four or more consecutive regular academic terms will be held to OSU's prior policy that resets the academic catalog to the catalog in effect at the time they return to OSU.

ASSOCIATE PROVOST FOR ACADEMIC SUCCESS AND ENGAGEMENT

Susie Brubaker-Cole, *Associate Provost for Academic Success and Engagement*

A500 Kerr Administration Bldg.

541-737-6164

susie.brubaker-cole@oregonstate.edu

The Office of the Associate Provost for Academic Success and Engagement works with faculty and university leaders in undergraduate education to advance the academic components of the provost's student success and engagement agenda. The associate provost provides leadership and coordination for nine academic support units within the division of Academic Affairs, and collaborates with departments, colleges and undergraduate education committees to develop and implement challenging academic programs and support resources to serve the diverse needs of OSU undergraduates.

Academic Affairs units reporting to the associate provost include:

- Academic Success Center
- Academics for Student Athletes
- The Writing Center
- College Assistance Migrant Program
- Educational Opportunities Program
- Student Support Services

ACADEMIC SUCCESS CENTER AND ALS COURSES

Clare Creighton, *Interim Co-Director*
Kerry Kincanon, *Interim Co-Director*

102 Waldo Hall

541-737-2272

Clare.creighton@oregonstate.edu

Kerry.kincanon@oregonstate.edu

Website: <http://success.oregonstate.edu/>

The Academic Success Center (ASC) is a friendly, student-centered place offering academic support services for all students at OSU. The ASC offers academic coaching, supplemental instruction, advising for exploring students (UESP), writing support, and information and referral.

Academic Learning Services (ALS) Courses

Academic Learning Services courses are designed to help students acquire a basic foundation of skills necessary for success in the university environment. They are not intended to form a significant part of any student's program, but instead, to help them complete a regular university degree program.

ALS is housed within the Academic Success Center. Many campus organizations and programs make up the courses within ALS and instructors come from throughout the university.

ALS COURSES

ALS 102. COLLEGE READING (3). Provides students with specific strategies for learning through reading. The primary focus of the course is to prepare students to function successfully in subsequent university course work. Emphasis is placed on the demonstration and practice of a study-reading process.

ALS 107. CAMP ORIENTATION (1-3). Assists students of migrant worker background to develop successful skills adaptive to the culture of higher education. This course is repeatable for a maximum of 9 credits.

ALS 108. ONLINE LEARNING SUCCESS (2). A comprehensive orientation for distance learners. The course will address topics such as success strategies for online learning, Ecampus resources, how to engage in the campus community, time management, OSU library resources, academic integrity and more. Graded P/N.

ALS 114. CAREER DECISION MAKING (2). Students will become knowledgeable about the world of work and career development theories using career assessment, literature, media, and computer resources. Lec/rec.

ALS 115X ORIENTATION TO ONLINE LEARNING (2). A comprehensive orientation for distance learners. The course will address topics such as success strategies for online learning, Ecampus resources, how to engage in the campus community, time management, OSU library resources, academic integrity and more.

ALS 116 ACADEMIC SUCCESS (2). Assessment and development of strategies for succeeding in university-level academics. Topics include time management, goal setting, critical thinking, note taking, and study skills. Graded P/N.

ALS 150. INTO OSU ACADEMIC READING AND WRITING 5 (3). Designed to provide international and/or immigrant students substantive practice in reading and writing English at the advanced level. Students are expected to read, understand and discuss a variety of academic readings from the natural and physical sciences, the social sciences, the humanities and literature. Students will work on reading skills; vocabulary acquisition; library and research skills; paraphrasing and summarizing; and the organization, style and development of essays. **PREREQS:** INTO Oregon State University students only.

ALS 151. INTO OSU ACADEMIC LISTENING AND SPEAKING 5 (3). Skill building to develop and improve comprehension and notetaking of lectures in an academic format. Students required to give individual and group presentations including informational, argumentative, and persuasive presentations. Instruction is given in cross-cultural communications styles, non-verbal communication, questioning techniques, and clarifying information. **PREREQS:** INTO Oregon State University students only.

ALS 161. ACADEMIC LISTENING AND SPEAKING 6 (3). Skill building to develop and improve comprehension and notetaking of lectures in an academic format. Students required to give individual and group presentations. Instruction is given in cross-cultural communication styles, non-verbal communication, questioning techniques, and clarifying information. **PREREQS:** ALS 150 and ALS 151 and INTO Oregon State University students only.

ALS 162. INTO OSU READING AND WRITING IN ACADEMIC CONTENT AREAS (3). Provides advanced practice in reading and writing with academic texts and is designed to help students move into college work. Assignments include extensive information searches, writing bibliographies, critiques of articles/readings, practice with essay exams, and a short research paper. **PREREQS:** ALS 150 and ALS 151 and INTO Oregon State University students only.

ALS 181. ESL BRIDGE (1-3). A support course for international students enrolled in OSU courses such as HHS 231, ENGR 111, GEO 105, and ANTH 210. It is called a "bridge" course because this course acts as a bridge to the regular university course. The bridge course provides the support you need as an international student to understand class assignments and vocabulary related to the course, and to help you build the language skills you need to fulfill written, oral, and group assignments for the regular university course. Classroom activities include discussions, in-class exercises, vocabulary games and exercises, online work on Blackboard and Internet sites applicable to the course content, mini-presentations, outlining, and quizzes focusing on the content of the university course. This course is repeatable for a maximum of 6 credits.

ALS 199. SPECIAL TOPICS (1-3). Graded P/N. This course is repeatable for a maximum of 9 credits.

ALS 199H. SPECIAL TOPICS (1-3). Graded P/N. This course is repeatable for a maximum of 9 credits.

ALS 210. HOW TO BE SUCCESSFUL IN YOUR INTERNSHIP SEARCH (2). Internship preparation course designed to provide students with the fundamental tools to find and secure an internship. Topics will include internship search strategies, resumes, cover letters, and interviewing. Guest speakers will provide additional insight into these topics from the perspective of employers and students with prior internship experience. Reflection on student's interests, values, and goals will also be integrated into the course.

ALS 212. LIFE AFTER COLLEGE (3). A variety of post-college experiences are examined, including family planning, managing finances, purchasing a car/insurance/home, and maintaining good credit.

ALS 225. TUTORING AND MENTORING SKILLS (1-3). Students are provided with tutoring and mentoring skills, and the opportunity to gain experience in working with diverse ethnic student groups. Students serve as tutors and mentors, and are provided with the opportunity to improve their own academic and communication skills. This course is repeatable for a maximum of 6 credits. **PREREQS:** Departmental approval required.

ALS 295. LAST YEAR EXPERIENCE (2). An introduction and analysis of post-college skill sets including the study of personal finance, career search techniques, communication skills, self-exploration and organizational integration. **PREREQS:** Junior and senior class standing.

ALS 299. SPECIAL TOPICS (1-3). This course is repeatable for a maximum of 3 credits.

ACADEMICS FOR STUDENT ATHLETES

Kate Halischak, *Director*

Third Floor, Beth Ray Center for Academic Support

541-737-9338

kate.halischak@oregonstate.edu

Website: <http://oregonstate.edu/studentathlete/>

The mission of Academics for Student Athletes (ASA) is to enable student athletes to achieve academic success through the provision of services that support the teaching and learning mission of the university. ASA strives to provide outstanding academic support and counseling that strengthen the persistence and success of student athletes through graduation, the academic performances of student athletes, the academic self-direction for student athletes, and the maintenance of NCAA compliance.

CENTER FOR TEACHING AND LEARNING

Kay Sagmillir, *Director*
Center for Teaching and Learning

Robin Pappas, *Assistant Director*
University-Wide Teaching Excellence

Cub Kahn, *Instructional Designer*
Teaching and Learning Technology

Nana Osei-Kofi, *Director*
Difference, Power and Discrimination Program

Vicki Tolar Burton, *Director*
Writing Intensive Curriculum Program

Stevon Roberts, *Instructional Web Designer*

Jeanna Towns, *Program Administrator*
jeanna.towns@oregonstate.edu
116 Waldo Hall
541-737-2804
Website: <http://oregonstate.edu/ctl/>

The CTL supports excellence in teaching and learning in the academic curriculum and learning in co-curricular settings. We have particular expertise in pedagogy and course design; general education; writing in the disciplines; difference, power and discrimination; teaching and learning technologies; global learning; GTA training and development; and classroom assessment techniques. Our services include individual consultation, faculty workshops and seminars, faculty learning communities, and orientations.

THE WRITING CENTER

Dennis Bennett, *Assistant Director*
Writing Center and Technology

Galina Romantsova, *English Language Learning Coordinator*
Writing Center
123 Waldo Hall
541-737-5640
Website: <http://writingcenter.oregonstate.edu>

The Writing Center is part of the Academic Success Center and is a support service for students and faculty at Oregon State University. Its mission is to provide writing programs that enable students at all levels to function effectively, efficiently, and confidently in an academic environment.

The Writing Center offers free help with any writing task at any stage of the writing process and is open to all OSU students, as well as to staff, faculty, and members of the Corvallis community. Writing assistants can help with all aspects of the writing process from brainstorming and organization to questions of grammar and usage. Call 541-737-5640 for an appointment.

COLLABORATIVE LEARNING CENTER

Located in The Valley Library's Learning Commons, the Collaborative Learning Center (CLC) offers a variety of resources for OSU students. During scheduled hours, peer tutors and graduate teaching assistants from the College of Science, the Center for Writing, the Academic Success Center, and Career Services are available to help students succeed.

Free drop-in tutoring is available from the Math Learning Center, Career Services, Chemistry (Mole Hole), Physics (Worm Hole). Students may also make appointments with Writing Center consultants or sign up for study tables managed by the Academic Success Center. There is no charge to use any of the learning services available in the CLC. Current schedules and a list of participating departments are available on the CLC website at <http://osulibrary.oregonstate.edu/clc>.

The CLC is designed to be a welcoming space for students. As part of the Learning Commons, it provides easy access to all of the resources in The Valley Library as well as:

- Computer workstations configured for both individual and collaborative work
- Moveable whiteboards
- Moveable tables and chairs, providing seating for more than 100 students
- "Mini" classrooms equipped with computers and whiteboards

COLLEGE ASSISTANCE MIGRANT PROGRAM (CAMP)

Amas Aduviri, *Director*
541-737-3923
amas.aduviri@oregonstate.edu
337 Waldo Hall
Oregon State University
Corvallis, OR 97331
541-737-2389
Website: <http://oregonstate.edu/dept/camp/>

The College Assistance Migrant Program is a federally-funded program through the U.S. Department of Education that provides support for first-year college students from migrant/seasonal farmworker backgrounds.

To be eligible, the student or the student's parents must have worked at least 75 days in the past 24 months in migrant/seasonal farmwork (including crop, dairy, poultry or livestock production, the cultivation or harvesting of trees, or work on a fish farm), be eligible for participation in a Migrant Education Program, or have attended a High School Equivalency Program (HEP) within the

last 12 months and have completed a GED.

CAMP students are eligible for the following scholarships and services:

- Placement testing and academic advising
- Quarterly book allowance to cover the cost of textbooks
- Monthly stipend throughout the academic year
- Personal counseling
- Travel allowance
- Supplemental aid to reduce debt and meet financial need
- Internship in residence halls
- Orientation/study skills workshops
- Financial aid counseling
- Health services
- Free tutoring
- Career orientation, job search skills development
- Other services as needed

COMPUTER CENTERS

Students at Oregon State have access to a wide variety of computer resources, from microcomputers to supercomputers, throughout the university. There are general access microcomputer facilities available to students at no charge. The microcomputer systems are networked so that they can act as workstations to access the campus mainframe and other facilities nationally and internationally. The College of Business facility contains 125 Hewlett-Packard PCs; the Milne facility contains 80 Pentium and 66 Power Macintosh systems; and the Bryan (Sackett Hall) facility houses 15 Pentium and 15 Power Macintosh systems. All facilities contain laser printers. The Milne facility is open 24 hours a day, seven days a week during the regular academic year.

In addition, many individual colleges, schools, and departments at OSU have their own computer facilities for use by students and faculty.

With thousands of individual computers located all over the campus, OSU students and faculty don't have to look far for the computer resources they need.

DIFFERENCE, POWER, AND DISCRIMINATION

Nana Osei-Kofi, *Director*
310 Waldo Hall
541-737-2824
nana.osei-kofi@oregonstate.edu
Website: <http://oregonstate.edu/dept/dpd/>

The Difference, Power, and Discrimination (DPD) Program, an affiliate of the Center for Teaching and Learning, offers support and training for faculty who teach DPD courses at Oregon State University. The DPD Program promotes the development of undergraduate courses that provide multidisciplinary perspec-

tives on difference, power, and discrimination in the United States.

EDUCATIONAL OPPORTUNITIES PROGRAM (EOP)

Janet Nishihara, *Director*

337 Waldo Hall

541-737-3628

janet.nishihara@oregonstate.edu

Website: <http://oregonstate.edu/dept/eop/>

The Educational Opportunities Program (EOP) was created at Oregon State University in 1969 and provides a welcoming environment that supports the full development of the personal and academic potential of students who have traditionally been denied equal access to higher education.

These groups include students of color, older-than-average students, students with disabilities, students who are single parents, low-income students, students who have been rurally isolated, veterans, or students who are the first generation in college.

The goals of the program include providing services which will:

- acclimate students to university culture,
- enhance each student's academic performance,
- develop each student's professional and personal growth, and
- assist students in developing a sense of belonging and a strong connection to the university.

Students in the program will have access to the following services:

- assistance through the admissions process,
- assistance in locating financial resources,
- orientation to the university,
- academic and personal counseling,
- courses to help review or fill in gaps in math, reading and writing, and
- assistance with finding jobs and internships, writing resumes and cover letters.

U.S. citizens or permanent residents interested in learning more about the program or in applying for services should visit the EOP website: <http://oregonstate.edu/dept/eop/>.

MATH LEARNING CENTER

Thomas P. Dick, *Director*

108 Kidder Hall

541-737-1570

tpdick@math.oregonstate.edu

Website: <http://www.math.oregonstate.edu/?q=mlc>

The Mathematics Learning Center provides assistance in all lower-division mathematics courses. Help is available

on a drop-in basis at no cost to students. Center hours in 108 Kidder Hall are 9 a.m. to 5 p.m., Monday through Thursday and 9 a.m. to 4 p.m. on Fridays from the second week of the term through dead week. MLC tutors are also available evenings in the Valley Library, 7 p.m. to 10 p.m., Sunday through Thursday. Make-up tests are sometimes administered in the MLC. Study materials, reference texts, and calculators are available. A computer lab is available for use by advanced math students in connection with some math courses. For more information, visit the website at <http://www.math.oregonstate.edu/?q=mlc>.

UNIVERSITY EXPLORATORY STUDIES PROGRAM

Kerry Kincanon, *Head Advisor*

102 Waldo Hall

541-737-8144

uesp.advisor@oregonstate.edu

The University Exploratory Studies Program (UESP) is an academic advising program for students who choose to explore majors at Oregon State University.

OSU students who are undecided about a major can elect to be in UESP. UESP students work through a decision-making process to help them learn more about themselves and the numerous academic options that OSU offers. They are encouraged to declare a major and transfer to an academic school or department once they have found the best fit. As part of a successful academic and university experience, UESP has targeted several important learning outcomes for its students:

- Per the university requirement, UESP students should complete the First-Year Skills courses (Writing I, Speech, Mathematics) in the baccalaureate core by the time they have earned 45 OSU-generated credits, and, the Second-Year Skills course (Writing II) by the time they have finished 90 OSU-generated credits.
- UESP student should know how to access and utilize MyDegrees, OSU's online degree audit system.
- UESP students should engage with active exploration activities and resources.
- UESP students should pursue involvement outside of the classroom.
- UESP students should set goals related to major declaration in alignment with UESP's defined major-decision making process.

UESP believes that regular consultation with a trained academic advisor will aid students in meeting these learning outcomes and moving through the major decision-making process. UESP

students are required to meet with an advisor at least once a term to discuss major options and experiential learning opportunities and to plan coursework for the subsequent term. Many students in UESP will also utilize Sigi³©, ALS 114, and the UESP website to assist in their exploration. UESP and Career Services co-sponsor access for all OSU students to Sigi³©, a comprehensive career planning website. Students can use the site to help them clarify their interests, values, and abilities, as well as find extensive information about the world of work. UESP coordinates ALS 114, Career Decision Making, a two-credit class available each term to any first- and second-year student interested in exploring major and career options in a classroom setting. UESP also provides a departmental website with exploration strategies, information about major and career exploration events on campus, and links to several career information websites.

WRITING INTENSIVE CURRICULUM PROGRAM

Vicki Tolar Burton, *Director*

306 Waldo Hall

541-737-3711

vicki.tolarburton@oregonstate.edu

Website: <http://wic.oregonstate.edu/>

The Writing Intensive Curriculum (WIC) Program offers support and training for faculty who teach writing intensive courses in the majors and promotes excellence in the teaching of writing at the university.

Primary functions include:

- Offering faculty development seminars on best practices for teaching writing in the disciplines.
- Consulting with faculty who are designing or revising WIC courses.
- Reviewing WIC course proposals for the Baccalaureate Core.
- Consulting with and making presentations to departments on issues of writing in the major.
- Publishing the WIC newsletter, Teaching with Writing.
- Developing and maintaining the WIC website, a rich resource for students and faculty, <http://wic.oregonstate.edu/>. In addition to writing help, the website includes criteria for WIC courses as well as links to a list of approved WIC courses.

Annually, the program invites departments to nominate their most outstanding student writer for a WIC Culture of Writing award in the discipline. Students who want information on WIC courses in their major should consult their departmental advisor.

Oregon State University Libraries and Press cultivates superior scholarship and creativity, empowers discovery, and preserves and disseminates knowledge. We develop user-focused services, share our expertise through teaching and research, and build gateways to unique resources to further the growth of the OSU community, the people of Oregon, and the global scholarly community. OSU Libraries supports the instructional and research needs of OSU students, faculty, and staff through both traditional and innovative services and collections. We advance OSU's land grant mission, contributing to learner success, scholarly excellence, and community engagement.

RESOURCES

The Oregon State University Libraries is the second largest research library in Oregon with three locations: The Valley Library at the main campus in Corvallis, The Marilyn Potts Guin Library at the Mark O. Hatfield Marine Science Center in Newport, and The OSU Cascades Library co-located at Central Oregon Community College in Bend.

The Valley Library collection includes materials in all subject areas, containing nearly 2 million printed volumes; subscriptions to more than 74,000 journal titles, most of which are available online; 500,000 maps and government documents; and hundreds of video and DVD recordings. As of 2012, more than 51,369 electronic books were available via the OSU Libraries' catalog. OSU Libraries digitized thousands of documents, photographs, and maps to make them more widely accessible for researchers, students, and the general public. Additionally, a notable collection of contemporary Northwest artwork is on display throughout The Valley Library with over 80 different artists represented.

The Valley Library provides a flexible learning environment that supports community and engaged learning. Two of its learning spaces are the Learning Commons and the Collaborative Learning Center (CLC). The Learning Commons offers a variety of spaces for groups to collaborate, as well as 118 computers (both Windows PCs and iMacs) that give students access to a wide variety of software. The CLC offers a variety of academic and student support services. Peer tutors and graduate teaching assistants from the College of Science, the Academic Success Center, and the Writing Center are available to assist students during scheduled hours in the CLC.

Partnering with Student Media Services gives students access to video editing and multimedia production software, large format printing, along with hardware including video cameras, microphones and audio recording equipment. In addition,

The Valley Library has 28 three-hour group study rooms, 37 90-day research rooms, six long-term research rooms, one media preview room and three designated floors for quiet study. A drop-in daycare facility is available on the third floor. Laptop computers are available to OSU students, staff and faculty for three-hour checkout and can be used with the wireless network anywhere in the library.

OSU Libraries supports faculty and student research not only through the purchased collection, but also through unique and rare materials held by the Libraries' Special Collections and Archives Research Center. Content in signature collecting areas is made freely accessible on the web to facilitate use by students, faculty, and other researchers. This includes extensive documents from the Ava Helen and Linus Pauling Papers, the History of Science Collections, the Oregon Multicultural Archives, the Natural Resources Collections, and the University Archives.

OSU Libraries also manages the ScholarsArchive@OSU institutional repository. This database makes a wide variety of information resources produced at OSU freely available on the web. Examples include faculty articles, OSU theses and dissertations, and all experiment and extension publications. ScholarsArchive@OSU is consistently ranked among the top ten institutional repositories in the United States, according to Webometrics (<http://www.webometrics.info/>).

OSU Libraries extends services and resources to the campus and off-campus community in a variety of ways. The collections can be accessed both online and through mobile devices. Hours at The Valley Library have been extended to 24 hours, five days a week (24/5), allowing OSU students and faculty access to collections as well as computers. The Valley Library has wireless throughout the building. Reference assistance is available in person and by phone, by e-mail, by text message, and by instant message during most hours when The Valley Library is open. Subject specialists are available by appointment for individual research consultation.

The Autzen Electronic Classroom in The Valley Library is an enhanced electronic classroom for library-related instruction. It provides a hands-on setting with 24-networked Mac mini dual-boot student workstations, Robotel Classroom Control Hardware, clickers, white boards, and a Smartboard.

OSU Libraries has two off-site branches. The Guin Library houses the research and teaching collection of Oregon State University's Hatfield Marine Science Center. The library's collection of more than 35,000 books and journals covers a broad range of marine-related topics including fisheries, aquaculture, oceanography, geology, environmental studies, and biology.

Oregon State University Libraries and Press
121 The Valley Library
Corvallis, OR
97331-4501
541-737-3331

ADMINISTRATION

Faye A. Chadwell,
Donald and Delpha Campbell University Librarian and OSU Press Director,
541-737-7300

Particular attention is paid to collecting material on marine fisheries, marine mammals, and information specific to the Northeast Pacific Ocean.

The Cascades Library in Bend, housed in the Barber Library of Central Oregon Community College, supports OSU-Cascades upper-division programs, including tourism and outdoor leadership and graduate programs in education. This is a relatively new branch campus that relies on the Cascades Library sharing the space and collections of the Central Oregon Community College Library to deliver services.

One on-campus branch facility is located in the College of Veterinary Medicine on campus. Open 24/7 to the college's academic community, the library has one full-time staff member, along with student employees paid by the college. OSU Libraries handles acquisitions and cataloging for the veterinary medicine collection, while the Veterinary Medicine Library fills interlibrary loan requests for items in the OSU Libraries' collection.

Since 2007, OSU Press has been a department of the OSU Libraries. OSU Press supports the university's strategic plan through its publication of scholarly and general interest books in forestry, natural resources management, and natural history as well as the cultural and social history of Oregon and the Pacific Northwest. The Press and Libraries collaborate on several projects including an open textbook initiative that supports the development of free online textbooks by OSU faculty.

COLLABORATION

As libraries move away from ownership to access, consortial memberships give OSU faculty and students a wide variety of information in a timely and efficient manner.

- OSU Libraries is a member of the Orbis Cascade Alliance which includes 37 Washington, Idaho, and Oregon universities, colleges, and community colleges with total holdings of 28.7 million titles.
- Membership in the Greater Western Library Alliance (GWLA) enables the Libraries to increase its digital presence through such sites as the Western Waters Digital Library. GWLA, a consortium of 32 research libraries from 17 Midwestern and Western states.
- OSU Libraries is a founding member and active contributor to the Northwest Digital Archives (NWDA), a consortium of 39 archives and special collections in Oregon, Washington, Idaho, Montana, and Alaska. NWDA provides enhanced

access to archival and manuscript collections across the northwest through a union database of Encoded Archival Description (EAD) finding aids.

- OSU Libraries participates in the Oregon Statewide Database Licensing Program that provides a suite of 22 general periodicals and reference database products from Gale/Cengage Learning, the database vendor that was awarded the state contract in 2013.
- As a member of the Center for Research Libraries, the OSU Libraries can provide unlimited access to all CRL resources — approximately five million publications, archives, and collections to supplement our holdings, especially in the areas of humanities and social science. OSU faculty can borrow CRL materials for extended loan periods.
- OSU Libraries is a member of the Western Regional Storage Trust (WEST), a distributed retrospective print journal repository program serving research libraries, college and university libraries, and library consortia in the Western Region of the United States.
- OSU Libraries is a member of the Coalition for Network Information, the Council on Library and Information Resources, OCLC (the world's largest library cooperative), the Library Publishing Coalition, and the Scholarly Publishing and Academic Resources Coalition."

OSU Libraries also collaborates with the University of Oregon Libraries on making joint decisions on collections, expanding access to each library's collections, sharing software, providing joint faculty/ staff development opportunities, and, in general, viewing the two libraries as a single library with shared purposes. This collaboration is especially visible in "Oregon Digital" (oregondigital.org), which provides integrated online access to digitized materials from both libraries.

OSU Libraries partners with the Institute for Natural Resources on the Oregon Explorer, a comprehensive, natural resources digital library designed to provide easy and rapid access to reliable, up-to-date information about the state's natural resources.

The most notable addition to the library's instruction program since 2010 has been the implementation of a library course designator that will allow OSU Libraries and Press to develop and offer a for-credit library sciences curriculum to partner with other academic departments to enhance student success in learning and development of critical thinking and life-long learning.

OSU PRESS

Faye Chadwell, *OSU Press Director and the Donald and Delpha Campbell University Librarian*

Thomas S. Booth, *Associate Director OSU Press*
121 The Valley Library
541-737-3166
Email: OSU.Press@oregonstate.edu
Website: <http://osupress.oregonstate.edu>

Since its founding in 1961, the Oregon State University Press has supported and enhanced the university's place as a major research institution by publishing outstanding works of scholarship by the faculty of OSU and of other institutions as well as works of general interest to readers in the state and beyond.

The OSU Press specializes in books of importance to the Pacific Northwest, especially those dealing with natural resource issues and the history, natural history, cultures, and literature of the region. The OSU Press has a long history of publishing books about the state and region, including guides to flora and fauna, atlases, guides to natural and historic sites; biographies, memoirs, and oral histories of cultural or historic importance; and literary works by some of the region's most accomplished writers.

The editorial program of the OSU Press includes several distinguished series of books:

- *Women and Politics in the Pacific Northwest*, edited by Dr. Melody Rose, Portland State University
- *Culture and Environment in the Pacific West*, which probes the relationships between cultural and environmental subjects west of the Rockies
- *Northwest Reprints*, which brings back into print classic works of fiction and nonfiction from the region's past
- *Northwest Readers*, which makes available collections of writing by notable Northwest authors and anthologies on provocative regional themes
- *Oregon Literature Series*, a project of the Oregon Council of Teachers of English
- *Northwest Photography Series*
- *Horning Visiting Scholars Series*
- *First Peoples: New Directions in Indigenous Studies*

Books published by the OSU Press have received awards for editorial and design excellence, including the Pacific Northwest Booksellers Association Special Award for Outstanding Contributions to Northwest Literature; *Choice Magazine* Outstanding Academic Title of the Year; inclusion in the Association of American University Presses Book, Jacket, and

Journal Show; Oregon Book Awards for Nonfiction and Literary Nonfiction; and the John Burroughs Society Medal from the American Museum of Natural History for a Distinguished Book of Natural History.

In 2007, OSU Press joined the OSU Libraries. Oregon State University Libraries and Press is a dynamic environment that promotes innovation, values diversity, nurtures creativity, and builds strong communities. Press staff work closely with library colleagues on projects and digital initiatives.

The press publishes 20 to 25 new books each year and has approximately 300 titles in print. The press also distributes select titles published by the University of Oregon Press and partners with other nonprofit organizations in the state on some projects. Publishing decisions are made in consultation with a faculty advisory board after external peer review of each project.

Members of the Editorial Board for 2013–2014 academic year are:

- **Peter Betjemann**, Chair, Oregon State University, English
- **Sy Adler**, Portland State University, Urban Studies and Planning
- **Katy Barber**, Portland State University, History
- **Susan M. Capalbo**, Oregon State University, Applied Economics
- **Steve Clark**, Oregon State University, University Relations and Marketing
- **Ellen Eisenberg**, Willamette University, History
- **Kenneth Helphand**, University of Oregon, Landscape Architecture
- **Peg Herring**, Oregon State University, Extension and Experiment Station Communications
- **Michael Nelson**, Oregon State University, HJ Andrews Experimental Forest
- **Jim Scheppke**, Oregon State Librarian (Retired)

The OSU Press is a member of the Association of American University Presses (<http://aaupnet.org/>)—a nonprofit organization whose purpose is to support university presses in their endeavor to make widely available the best of scholarly knowledge and the most important results of scholarly research; to provide an organization through which the exchange of ideas relating to university presses and their functions may be facilitated; and to afford technical advice and assistance to learned bodies, scholarly associations, and institutions of higher learning.

OSU Press books can be purchased from local and national booksellers as well as online at <http://osupress.oregonstate.edu>. Additional information for authors wishing to submit manuscripts, is also available at <http://osupress.oregonstate.edu/for-authors>.

INFORMATION, SERVICES

<http://oregonstate.edu/is>

Information Services supports OSU students by providing accounts, technologies, equipment checkout, printing, computing networks, and computing labs. The OSU Computer Helpdesk provides students with technical support for laptops, mobile devices, and campus systems like Blackboard, and if you need in-person support, please visit the Walkup Helpdesk in the Valley Library.

Student employment opportunities are available from a variety of units within IS, including Student Computing Facilities and the OSU Computer Helpdesk, with the greatest opportunities announced just prior to each new term.

ACCOUNTS AND PASSWORDS

<http://oregonstate.edu/is/accounts-support>

- *Accounts & Technologies Guide for New Students*: This guide is for new OSU students who need to get connected to OSU systems such as email and Blackboard. Even if you are already connected to one or more OSU systems, we recommend you go through this guide, anyway, just to be sure you've covered the bases and know where to get computing help.

- *ONID*: ONID stands for OSU Network ID. It's a universal computer account available to all OSU students and employees. You use your ONID username and password to access Online Services, Blackboard, ONID email, the wireless network, and many other university computing services.
- *Google Apps for OSU*: ONID email is accessed via Google Apps for OSU. All OSU students, instructors, and employees may access all the supported core apps: Drive, Mail, Calendar, Site, and Groups.

LEARNING TECHNOLOGIES

<http://oregonstate.edu/is/learning-technologies>

- Blackboard, OSU's Learning Management System used by both off-campus and on-campus students for classwork.
- Computing Labs
- Equipment Loan and Rental
- Standard ONID Printing
- Printing—Posters and Large Format
- Virtual Computing Lab (RemoteApps)
- Wireless Network

SOFTWARE

<http://oregonstate.edu/is/accounts-support/software>

- OSUware: Free Antivirus and Remote Access Software

TECHNICAL SUPPORT

- OSU Computer Helpdocs, <http://oregonstate.edu/helpdocs>, 24/7 help guides and FAQs
- OSU Computer Helpdesk, <http://oregonstate.edu/is/client-services/och>, Monday–Friday support via phone at 541-737-3474 and via email
- Walkup Helpdesk at the Valley Library Sunday–Friday support in person

STUDENT EMPLOYMENT

(Opportunities subject to availability)

Student workers provide programming, development, and support services for the OSU community. Please follow each unit's application guidelines. Some units accept applications during particular dates only and employment cannot be guaranteed. Potential employment is contingent upon eligibility per university policy on student employment.

- OSU Computer Helpdesk
- Technical support, programmers
- Central Web Services
- Web app and mobile app developers
- Student Computing Facilities
- Customer service and support, system maintenance

MISSION

To produce timely statistics, qualitative information and analyses that support university strategic planning and decision-making.

FUNCTION

Institutional Research, under the Office of Academic Affairs, provides services to offices and departments at Oregon State University. Responsibilities include:

- Developing and analyzing university strategic indicators and performance measures, drawing upon institutional data from all sectors of the university;
- Maintaining data archives to support longitudinal profiles and studies;

- Generating datasets of strategic interest to the university using survey instruments;
- Conducting research on issues of strategic importance to the university using national and institutional databases;
- Responding to federal, state and other external requests for institutional data;
- Supporting the academic unit program review process;
- Enhancing and improving the curricular review process; and
- Serving as a resource for the university on institutional research issues.

**Office of
Institutional
Research
Oregon State
University
500 Kerr
Administration
Building
Corvallis, OR
97331-8572
541-737-9600
541-737-8083**

ADMINISTRATION

**Salvador
Castillo,**

Director

salvador.castillo@

oregonstate.edu

Website: [http://](http://oregonstate.edu/adminlaair/)

oregonstate.edu/

adminlaair/

The educational resources of the university include art, galleries, collections, and exhibits of cultural and scientific materials. Research, teaching, and extension functions are combined in these collections, which serve both the institution and the general public.

Over the years, various departments and schools of the university have become repositories for extensive holdings of manuscripts; rare books; prints, paintings, and other art objects; costumes; textiles; historic artifacts; archaeological material; fossils; preserved plants and animals; wood products; and marine material. These collections serve many of the same functions as a library or make possible the identification of materials whose age, name, or significance is unknown.

Most university collections serve primarily research and teaching functions and may be viewed by prior appointment with their curators. Permanent collections and museums include:

ARCHAEOLOGICAL COLLECTION

David R. Brauner, *Curator*

The Archaeological Collection consists of artifacts, field notes, maps, drawings, sketches, and photographs accumulated in archaeological investigations. Several thousand items of primary archaeological documentation comprise this collection. Location: Waldo Hall.

ART ABOUT AGRICULTURE

S.J. Curtis, *Curator*

The College of Agricultural Sciences has sponsored Art About Agriculture since 1983, as a source for education, inspiration, and research enabling people to understand and value agriculture and natural resources through the universal language of visual arts. The program, in part, recognizes regional artists for investigating agriculture and natural resources themes as content and subjects for creating their works of art. It also enables the college to acquire art for a permanent collection of contemporary fine art now representing more than 150 artists with their more than 250 works of art. The Art About Agriculture permanent collection, selected through peer review, comprises fiber arts, mixed media assemblages, paintings, sculptures, watercolors, and works on paper including drawings, photographs, and prints. Many distinguished artists are represented in the Art About Agriculture permanent collection, including Harrison Branch, Sally Cleveland, Betty Feves (1918–1985), Sally Finch, Sally Haley (1908–2007), Carl Hall

(1921–1996), (Manuel Izquierdo (1925–2009), Mary Josephson, Betty LaDuke, Marjorie McDonald (1898–1995), John Henry Rock (1919–1993), Laura Ross-Paul, Nelson Sandgren (1917–2006), Robert Schlegel, Robert Weller, and Renée Zangara.

Since the program began the college has collaborated with more than 50 galleries, primarily in Oregon, and also Washington, and British Columbia, Canada, for presenting the permanent collection, invitational art exhibitions, and regional art competitions. In 2006 the college cosponsored in partnership with the Oregon Historical Society a retrospective exhibition of the entire juried Art About Agriculture permanent collection. The late Brenda Hood, in memory of her husband, the late Gordon Hood, sponsored *This Bountiful Place: Art About Agriculture, the Permanent Collection*, an exhibition catalog published in association with the Oregon Historical Press, 2006.

Accessions to the Art About Agriculture permanent collection are made possible from patron-donor partnerships. The College of Agricultural Sciences is grateful for support from the deans of OSU Extension Service, College of Agricultural Sciences, and College of Liberal Arts; Dan and Wanda Arp; Todd and Sarah Bastian; Betty Brose; Gene and Cande Buccola; Capital Press; James and Stella Coakley; Marybeth Collins; William Cook and Gwil Evans; The Ford Family Foundation; the Carl Hall Family Collection through Bill Rhoades; the late Margaret Hogg; the late Brenda and Gordon Hood; E. R. Jackman; Larry and Sherry Kaseberg; Betty LaDuke; the Lamb Foundation; Beth and Edward Ray; and the late Gayle Strome. All gifts made to the OSU Foundation-Art About Agriculture qualify as contributions under current state and federal tax codes, including the Oregon Cultural Trust, and may be made at any time.

DEPARTMENT OF FISHERIES AND WILDLIFE'S BIRDS, MAMMALS, AND FISHES COLLECTIONS

Bruce Dugger, *Curator of Birds*

Brian Sidlauskas, *Curator of Fishes*

Clinton W. Epps, *Curator of Mammals*

The Department of Fisheries and Wildlife's Birds and Mammals Collections include more than 9,000 specimens of birds and 10,000 specimens of mammals, as well as the Braly Ornithological Collection; Overton Dowell, Jr., Bird Collection; Alex Walker Ornithological Collection; and Oregon Game Commission Collection. The Ichthyological Collection contains more than 19,000 cataloged

lots of fish representing approximately 200,000 specimens and 45 nominal type specimens. In addition, there are about 100,000 uncataloged specimens available for study. More than 13,000 frozen tissue specimens are available for genetic analysis. The collection emphasizes fishes of the Pacific Northwest, but also holds specimens from many parts of the world including Japan, Iran, Peru, Trinidad, Thailand and India. It recently added many fishes from Guyana. Use of the Department of Fisheries and Wildlife collections is restricted to qualified students and investigators. Location: Nash Hall.

FAIRBANKS ART GALLERY

Douglas Russell, *Director*

Website: http://oregonstate.edu/fairbanks/gallery/Current_Exhibit_.html

Fairbanks Gallery features exhibitions focusing on contemporary Northwest regional, national, and international artists. This program provides the public, campus, and student communities diverse creative experiences and interactions with the inspired, inventive world of visual art. In many cases exhibitions are accompanied by gallery talks, and sometimes also by classroom workshops, critiques and public lectures. Past one-person exhibits have featured notable artists such as Ruth Bernhard, Sue Coe, Wolf Kahn, Jacob Lawrence, Robert Motherwell, Philip Pearlstein, Wayne Thiebaud, Jerry N. Uelsmann, Edward Weston, Jenny Schmid, and Bill Viola. Group shows have included artists Robert Colescott, Christo, Jim Dine, Eric Fischl, Roy de Forest, Helen Frankenthaler, Ann Hamilton, David Hockney, Jenny Holzer, Roy Lichtenstein, Henri Matisse, Peter Milton, Robert Motherwell, James Rosenquist, Frank Stella, Andy Warhol, and William Wegman.

Fairbanks Gallery hosts many engaging and informative events. **Pondering the Muse** is a series of talks that examine the aesthetic and symbolic aspects of the artwork on display. These informal discussions also explore the artist's intent, historical references, design theories, and technical processes. All of the talks in this series are free and open to the public. In addition, we arrange talks for visitors ranging from elementary school students to art museum docents in specially scheduled presentations.

Email list

If you would like to be added to the email list to be notified of Fairbanks Gallery events and the Visiting Artists and Scholars Lecture program, please visit our Web page at http://oregonstate.edu/fairbanks/gallery/Join_Email_List.html.

Location

Fairbanks Gallery is located in Fairbanks Hall, at the corner of S.W. 26th Street

and S.W. Jefferson Way on the Oregon State University campus in Corvallis, Oregon. See our Web page for more directions.

Hours

Hours are 8 a.m.–5 p.m., Monday–Thursday, and 8 a.m.–noon, Friday. Occasionally the gallery will be closed during holidays and term breaks. To confirm gallery hours call 541-737-4745.

Facebook

Become a fan at Fairbanks Gallery of Art at Oregon State University at <http://ja-jp.facebook.com/pages/Fairbanks-Gallery-of-Art-at-Oregon-State-University/312382130024>.

FINE ARTS PRINT COLLECTION

Douglas Russell, Curator

Website: <http://oregondigital.org/digcol/fairbanks/>

The School of Arts and Communication's Fine Art Print Collection contains nearly 600 prints representing numerous countries and spanning several centuries. The collection's holdings includes work of various styles, including Japanese Ukiyoe, modern Japanese woodblock, 20th century Latin American, German Expressionism, and 20th century American prints. Artists include Max Beckmann, Francisco Goya, Hideo Hagiwara, Hiroshige Utagawa, William Hogarth, Kathe Kollwitz, Kunisada, Mauricio Lasansky, Otto Mueller, Max Pechstein, Robert Rauschenberg, Jun'ichiro Sekino, Edward Weston, Yeizan and others.

Prints in the collection have been largely donated over the last seventy years from various sources, including patrons, faculty members, international donors, professional artists, and former students. The collection began in earnest under the direction of Gordon Gilkey. Formerly the chair of OSU's former Department of Art, Gilkey became the Dean of the College of Liberal Arts, and later became the curator of the Vivian and Gordon Gilkey Center for Graphic Arts at the Portland Art Museum. While chairman of the Department of Art at OSU, he hired numerous faculty who were talented printmakers. Berk Chappell, John Rock, Paul Gunn, Shepard Levine, Nelson Sandgren, and Demetrios Jameson not only made prints, but helped collect and find donations to add to the collection.

A World Print Competition portfolio of twenty prints was added in 1973. Portfolios of Latin American artists were organized as *Actualidad Gráfica Panorama Artístico*, and OSU was a recipient in 1975 and 1976. Photographs are included in this collection. In 1974 photography students petitioned the OSU Foundation to fund the purchase of

an edition of The Edward Weston Fiftieth Anniversary Portfolio.

A six-year rejuvenation project of preservation, cataloguing, and digital photography has culminated in a new collection website. The collection now serves as an educational resource for the students and faculty at OSU, and the prints are now also accessible via the Web for the general public and other educational institutions. The website also acts as a research center for art students, who can research prints and submit research papers to be Web published. The collection is housed in Valley Library, which offers important temperature and climate controls.

GEOLOGICAL COLLECTIONS

Andrew Meigs, Geology Program Director

The Geological Collections include minerals, rocks, and fossils. The Edward Taylor Mineral Collections (F. Tepley, Curator) contain several thousand rare and fine specimens. Over 5,000 fossil specimens of Paleozoic, Mesozoic, and Cenozoic marine invertebrates comprise the outstanding John H. Howard and Earl L. Packard Collections in Paleontology (A.G. Grunder, Curator). Location: Wilkinson Hall.

THE HERBARIUM

Aaron I. Liston, Director

The Herbarium contains more than 405,000 named specimens of seed plants, ferns, mosses, algae, fungi, and lichens. Emphasis is on collections from western North America. The herbarium is the repository for the Morton E. Peck Herbarium of Willamette University, a research collection of Oregon flora consisting of more than 30,000 sheets, and the former University of Oregon herbarium. The mycological collections (J. Spatafora, Curator) consist of approximately 75,000 dried specimens of fungi and lichens, supplemented by microscope slides and a culture collection. These collections include the H.C. Gilbert Myxomycete Collection and the Forest Service Pathology Herbarium. Location: Cordley Hall. Website: <http://www.oregonstate.edu/dept/botany/herbarium/>.

HERPETOLOGICAL COLLECTION

Stevan J. Arnold, Curator

The herpetological research collection consists of more than 60,000 ethanol-preserved amphibians and reptiles, and approximately 24,000 frozen tissue samples. The collection has excellent

representation for sites in the Pacific Northwest and includes the largest collection of garter snakes (*Thamnophis*) in the world. These and other aspects of the collection are described at the collection website <http://oregonstate.edu/~arnoldst/herp%20collection.htm>. Location: Cordley Hall.

THE J.C. BRALY NATURAL HISTORY COLLECTION

Robert T. Mason, Curator

The Natural History Collection includes 550 mounts of birds and mammals in the J.C. Braly Collection. A collection of specimen skins on the first floor is used mainly for teaching. In addition, over 1,000 preserved specimens of amphibians and reptiles from the Pacific Northwest constitute a considerable part of the teaching collection. Location: Cordley Hall.

THE LASELLS STEWART CENTER GALLERIES

Tina Green-Price, Curator and Assistant Director of The LaSells Stewart Center

The LaSells Stewart Center 875 SW 26th Street (located directly across from Reser Stadium) Corvallis, OR 97331 Oregon State University

The LaSells Stewart Center was constructed from patron-donor funds in 1981 and is the first performing arts venue and conference center on the campus of Oregon State University. The galleries at The LaSells Stewart Center offer visitors the opportunity to experience three distinct art galleries: Giustina Gallery, Murdock Gallery, and South Hall Display Case.

Giustina Gallery is located in the heart of The LaSells Stewart Center and is the largest art gallery in Willamette Valley. It proudly hosts 10 to 12 exhibits each year, featuring fine art of all mediums with over 450 local, regional and international artists represented. Giustina Gallery is recognized for cultivating creativity and building connections among the community and artists. Murdock Gallery provides art enthusiasts a more intimate art work experience—with nearly 64 linear feet of display area. South Hall Display Case features local artists in a two- and three-dimensional presentation case.

Collectively, the galleries provide the local and campus community diverse opportunities to view and display art work. Annual exhibits include: Vista and Vineyards, Art about Agriculture, Cultural Connections Exhibit, Community Art Exhibit, plus many more. Each exhibition is accompanied with a public art reception.

View upcoming exhibits, <http://oregonstate.edu/lasells/gallery>.

Sign-up to receive email notifications about upcoming art exhibits and receptions, performances and public sessions, <http://oregonstate.edu/lasells/Weekly-Happenings>.

Standard Hours of Operation: Monday–Friday, 8 a.m. to 5 p.m., and evenings and weekends during events. To learn more about The LaSells Stewart Center or its galleries, visit, <http://oregonstate.edu/lasells/>.

MEMORIAL UNION ART COLLECTION

Susan Bourque, *Curator*

541-737-6371

Website: <http://mu.oregonstate.edu/about/history>

To see and interact with *OSU Memorial Union Art Collection* go to: <http://www.facebook.com/pages/OSU-Memorial-Union-Art-Collection/17460794118>

Throughout the Memorial Union are selections from its permanent art collection. The collection began in 1928 with a gift from the Board of Regents, but the foundation of the collection came in 1943 with a donation of fifty-three William Henry Price paintings. Currently among the 125 artists included in the collection are paintings and sculptures by J. Leo Fairbanks, works from the early nineteen hundreds by Carrie Gilbert depicting Native Americans, prints collected and donated by Gordon and Vivian Gilkey, and historic photographs of OSU (a number of which are on display in the mezzanine hall). Art work commissioned under the Oregon's Percentage for the Arts Programs includes murals by Hector Hernandez, Henk Pender and Sherrie Wolf. The collection has over 300 works of art, half of which are on display at any one time throughout the building.

MEMORIAL UNION CONCOURSE GALLERY

Susan Bourque, *Exhibits Coordinator*

541-737-6371

Website: <http://mu.oregonstate.edu/art-gallery/>

The Memorial Union Concourse Gallery is one of the largest exhibition spaces on the OSU Campus. Several contemporary art exhibits reflecting a diversity of styles, media and cultural perspectives are scheduled throughout the year. These exhibits feature the artwork of international, regional, local recognized artists, and the art of talented OSU students. This program provides the public, campus, and student communities an opportunity to experience and engage their visual senses as they walk the long concourse or

take a break in one of the many seating options available. Some exhibits have related gallery talks, lectures, and/or receptions, when offered, detailed information will be available from our website. The gallery is located at the heart of campus in the historic and beautiful Memorial Union, on 26th and Jefferson Streets.

Gallery hours during the academic year: Monday–Saturday, 8 a.m.–11 p.m.; Sunday, 10:30 a.m.–11 p.m. Term breaks and summer: Monday–Friday, 8 a.m.–5 p.m.

OREGON STATE ARTHROPOD COLLECTION

David R. Maddison, *Director*

Christopher J. Marshall, *Curator and Collection Manager*

The Oregon State Arthropod Collection is a valuable research collection of nearly three million insect and mite specimens, chiefly from the Pacific Northwest. Collection strengths include Coleoptera, Hemiptera, Lepidoptera, and Hymenoptera. Areas of specialization include the Melville Hatch Beetle Collection, mites associated with insects and marine habitats, sphecoid wasps and bees of the world, leaf hoppers and plant bugs of North America, aquatic insects, litter arthropods, butterflies, and moths of the Pacific Northwest. Specimens of historic importance include the Hopkins Collection of western forest insects and voucher material of the H.J. Andrews (LTER). Location: 4082 Cordley Hall. Visit the website at <http://osac.science.oregonstate.edu>.

SCHOOL OF ARTS AND COMMUNICATION SLIDE COLLECTION

The School of Arts and Communication Slide Collection contains 90,000 slides of paintings, sculpture, architecture, crafts, graphic design, and general design from prehistoric times to the present. The collection is primarily for use by faculty in their classes. Location: Fairbanks Hall. Contact School of Arts and Communications, 541-737-4745.

SCHOOL OF DESIGN AND HUMAN ENVIRONMENT

Elaine L. Pedersen, *Collection Manager*

The School of Design and Human Environment (E. Pedersen, Collection Manager) houses a collection of approximately 2,800 historic and ethnic textiles and costumes. Among the earliest textiles in the collection are those from Coptic Egypt and pre-Columbian Peru. A collection of more than 300 historic American

and European costumes dates from 1805 to the present. Location: Milam Hall. Additional information is available on the World Wide Web at: <http://business.oregonstate.edu/sdhe/historic-collection>.

SPECIAL COLLECTIONS & ARCHIVES RESEARCH CENTER

Lawrence A. Landis, *Director*

The University Libraries' Special Collections & Archives Research Center maintains and makes available the university's unique collections of manuscripts, archives, photographs, and books. Its holdings include collections pertaining to the history of science and technology; the historical records of OSU and papers of its prominent faculty members; collections documenting cultural and ethnic groups in Oregon; and collections documenting natural resources in the Pacific Northwest, especially agriculture and forestry.

The **Ava Helen and Linus Pauling Papers** is the center's cornerstone history of science and technology collection. It is an archival research collection of more than 500,000 items which chronicles the life and work of OSU alumnus Dr. Linus Pauling, the only person in history to have received two unshared Nobel Prizes (Chemistry, 1954; Peace, 1962). The collection, donated by Dr. Pauling in 1986, includes the original manuscript for Pauling's seminal 1931 paper, *The Nature of the Chemical Bond*; the research notebooks and working manuscripts for a number of Pauling's over 1,100 journal publications and 13 books; and the original petition for nuclear disarmament presented to the United Nations in 1958, which contains the signatures of more than 9,000 scientists worldwide, including Nobel laureates Albert Schweitzer and Bertrand Russell. The archive also includes Dr. Pauling's numerous awards, over 100 hours of audiovisual material, his mammoth correspondence with many of the most prominent figures of the twentieth century, and a significant trove of molecular models constructed by Pauling. The collection serves the research interests of scholars from around the world. See <http://scarc.library.oregonstate.edu/coll/pauling/index.html>.

Another significant area within history of science and technology are the **Atomic Energy and Nuclear History Collections**. The collections include the first published account of the discovery of radioactivity in 1896, writings on the Manhattan project, the hearings of Robert Oppenheimer, and a formerly secret report of the effects of the atom bomb. It also features cultural aspects of the atomic age. See <http://>

scarc.library.oregonstate.edu/coll/energy/index.html.

The center is the official repository for the historical records created by OSU. The university archives component of the center was established in 1961 to collect, describe, preserve, make accessible to the public, and display historical records created or received in connection with the transaction of university affairs. Closely connected to the university records are the personal papers of several hundred OSU faculty, dating back to the 19th century. More than 300,000 historic photographs document campus buildings, university programs, special events, athletics, faculty, and students. A large collection of memorabilia consists of individual historical items such as programs, posters, brochures, and clippings. See <http://scarc.library.oregonstate.edu/university-history.html> for information about collections and other resources pertaining to OSU's history.

The **Oregon Multicultural Archives** was established by the OSU Libraries in 2005 to assist in preserving the histories and sharing the stories that document the lives and activities of African American, Asian American, Latino/a, and Native American communities of Oregon. Significant collections and projects include the Urban League of Portland Records, the Braceros in Oregon Photograph Collection, the Japanese American Association of Lane County Oral Histories, and the 2012 Oregon Tribal Archives Institute. See <http://scarc.library.oregonstate.edu/oma/index.html>.

The center's holdings include numerous collections pertaining to natural resources in the Pacific Northwest. A core collection in this area is the **Gerald W. Williams Collection**, which includes the personal papers and collected historic photographs of Williams, former chief historian for the U.S. Forest Service. Other significant natural resources related collections include the papers of wildlife conservationist William L. Finley, the Pacific Northwest Stream Survey Records, and the Alderman Farms Films. See

<http://scarc.library.oregonstate.edu/natural-resources.html> for information about natural resources related collections.

The **McDonald Collection** is the university's premier collection of rare books. Fine examples of typography, incunabula, works of famous illustrators, numerous fine bindings, and several first editions are represented in the collection. See <http://scarc.library.oregonstate.edu/coll/mcdonald/index.html>.

The center's collections are open to students, faculty, staff, and the public for research from 8:30 a.m. to 5 p.m., Monday through Friday. The center encourages the use of its collections in undergraduate and graduate classes; instruction services range from general orientation sessions to more specialized sessions with hands-on examination of archival materials in a classroom setting. Tours of the center are available upon request. More information about the center's services and holdings is available at <http://scarc.library.oregonstate.edu/>. Location: Valley Library.

VALLEY LIBRARY NW ART COLLECTION

Ruth Vondracek, *Humanities Librarian*

The Valley Library NW Art Collection of contemporary art by Northwest artists consists of 120 artworks selected in collaboration with the Oregon Arts Commission through the Oregon Percent for Art law. Located throughout the Valley Library, the collection includes paintings, sculptures, photographs, lithographs, prints and other media. A self-guided tour is available at the reference desk. The website http://osulibrary.oregonstate.edu/libraries_and_collections/art/ has images of all artworks and information about the artists. Location: Valley Library.

VISITOR CENTER, OSU MARINE SCIENCE CENTER

William Hanshumaker, *Public Marine Education Specialist*
Extension Sea Grant Faculty
Hatfield Marine Science Center
2030 SE Marine Science Dr.
Newport, OR. 97365-5296
541-867-0167
Website: <http://hmssc.oregonstate.edu/visitor/>

The Visitor Center of the HMSC at Newport features aquariums, interactive exhibits, and hands-on displays that bring to life the marine research conducted by OSU scientists. Special events, educational programs, guided tours and walks are available on request to teach visitors about the ocean and its inhabitants, from undersea volcanoes to the tiniest tide pool creatures.

The Visitor Center serves as a social laboratory for OSU Sea Grant's "Free-choice Learning" initiative.

THE XYLARIUM (WOOD COLLECTION)

Barbara Lachenbruch, *Curator*
541-737-4213
Website: <http://woodscience.oregonstate.edu/research-community/facilities/xylarium>

The Xylarium (Wood Collection) contains approximately 2,500 species of wood, primarily from North and South America, Southeast Asia, and Africa.

OSU ALUMNI ASSOCIATION

Kathy Bickel, *Executive Director*
204C CH2M HILL Alumni Center
541-737-2351
kathy.bickel@oregonstate.edu
Website: <http://www.osualum.com/>

The OSU Alumni Association seeks to enrich the lives of alumni and friends by helping them establish lifelong relationships with the university and with each other. Memberships are available to all graduates, former students and friends of Oregon State University. Current students are welcome to join the affiliated OSU Student Alumni Association, which helps maintain OSU traditions and assists its members in making mentoring connections with OSU alumni. The OSUAA publishes and maintains the *Oregon Stater* magazine, Beaver E-clips electronic news service, and the online alumni community at <http://www.osualum.com>. It also organizes alumni gatherings around a variety of athletic, cultural and educational events as well as class reunions. A board of directors from various geographical districts, academic disciplines and age groups, representing OSU's diverse alumni community, governs the association.

GOVERNMENT RELATIONS

Jock Mills, *Director*
652 Kerr Administration Bldg.
541-737-0725
jock.mills@oregonstate.edu

Kate Sinner, *Director of Federal Relations*
OSU Portland Center
707 SW Washington St. Ste. 500
Portland, OR 97205
503-553-3445
kate.sinner@oregonstate.edu
Website: <http://oregonstate.edu/government/>

Located in the president's office, Government Relations coordinates the university's efforts with state, federal, and local governments. The office provides state and federal legislative information and services to the university community, including assistance in working with the Oregon Congressional delegation, other members of Congress, state legislators, legislative committees, and other lobbying groups. The office also works with the governor's office, state and federal agencies, and other universities.

OREGON STATE UNIVERSITY FOUNDATION

J. Michael Goodwin, *President and CEO*

Foundation Bldg.
850 SW 35th St. at Western Blvd.
Corvallis, OR 97333
541-737-4218 or 800-354-7281

OSU Portland Center
Union Bank Bldg.
707 SW Washington St., Suite 500
Portland, OR 97205
503-553-3400 or 866-218-8930
Email: OSUFoundation@oregonstate.edu
Website: <http://osufoundation.org>

The Oregon State University Foundation, a private, nonprofit organization, dedicates itself to garnering the resources that enable OSU to achieve excellence in education, research, and outreach.

Private support deepens the university's impact and extends its reach across our state and around the world by helping to make an OSU education accessible to all qualified students, pushing the frontiers of knowledge, contributing to the state's prosperity, and addressing many of the most pressing challenges facing our planet and its people.

Together with university and alumni leaders, the foundation publicly launched The Campaign for OSU, the university's first comprehensive fundraising campaign, in 2007. Guided by OSU's strategic plan, the campaign seeks \$1 billion to provide opportunities for students, strengthen Oregon's economy, and conduct research that changes the world. The campaign will run through 2014 and will help advance OSU's drive to be recognized as a leading international research institution.

Through the campaign, donors have created over 600 new scholarship funds, more than doubled OSU's number of endowed faculty positions, and supported 28 major facility construction and renovation projects, including the \$62.5 million Linus Pauling Science Center, the university's largest academic building project.

The foundation, which is governed by a 42-member volunteer Board of Trustees, manages the majority of OSU's composite endowment, valued at more than \$440 million, which supports Oregon State University and the people it serves.

UNIVERSITY RELATIONS AND MARKETING

Steven J. Clark, *Vice President for University Relations and Marketing*
634 Kerr Administration Bldg.
541-737-4875
Website: <http://oregonstate.edu/ua/>

The Oregon State University Division of University Relations and Marketing serves as the communications interface between the university and its various publics. Our work helps our audiences better navigate through the organization. By creating credible, timely, authentic and confident communications opportunities that foster conversations, we heighten awareness and appreciation of OSU's distinctiveness and value. Comprised of the departments of News & Research Communications, University Events, University Marketing, and Web Communications, each unit is focused on building relationships and advancing OSU's brand and reputation through development of marketing strategies that marry fact-based decision making, innovative practices and superior creativity. We measure success through a variety of metrics, including the quality and diversity of our students and faculty; OSU's reputation of distinction in the three defined signature areas; support from alumni, donors and the Legislature; pride for the institution from our various audiences; and the sense of community we foster on our campuses.

NEWS AND RESEARCH COMMUNICATIONS

Mark Floyd, *Director*
416 Kerr Administration Bldg.
541-737-4611

News and Research Communications serves as the university's primary office for media relations, research communications and internal communications. Promoting OSU's distinction and value through a communications focus on the university's strategic areas of strength, the department builds the university's reputation for excellence in research, education and service to the public. News and Research Communications is part of University Relations and Marketing, OSU's award-winning marketing communications division, which includes Events, Marketing, Trademark Licensing, Web Communications and the Office of the Vice President for University Relations and Marketing.

UNIVERSITY EVENTS

Shelly Signs, *Director*
205 Adams Hall
541-737-0724
Email: shelly.signs@oregonstate.edu

The office of University Events strategizes, plans and implements high-impact events and manages special projects that engage internal and external audiences. Through these activities, we provide outstanding experiences that enhance the understanding of the institution's brand, and help foster support and engagement in the mission and goals that define Oregon State as a leading 21st century land grant university.

UNIVERSITY MARKETING

Melody Oldfield, *Director*
102 Adams Hall
541-737-8956
melody.oldfield@oregonstate.edu

University Marketing creates and executes clear, consistent and engaging strategies that advance the brand reputation of Oregon State University. By sustaining a strong brand image for the university, we promote awareness, understanding and support among OSU students, faculty, alumni, donors and other communities. University Marketing also strives to enhance the university's name recognition and awareness, locally, regionally and nationally, through licensed merchandise bearing registered trademarks of the university.

INTERACTIVE COMMUNICATIONS

David Baker, *Director*
102 Adams Hall
541-737-8323
david.baker@oregonstate.edu

Interactive Communications advances the reputation of Oregon State University through digital marketing and brand alignment, multimedia and interactive storytelling. We are responsible for the university's home page and top-tier websites. We produce targeted online marketing campaigns and create video and multimedia for broadcast television, events and the web.

University Conference Services delivers the highest level of quality standards for conferences, events, seminars, meetings and the performing arts. Through partnerships developed on- and off- campus, and from our two unique offerings, OSU Conferences Services (a conference management team) and The LaSells Stewart Center (a state-of-the-art conference and performing arts venue), clients benefit from invaluable, extraordinary and innovative experiences.

Partnerships for Achieving Excellence – Oregon State University Conference Center

Oregon State University Conference Center boasts one of the most successful collegiate conference programs in the nation with two world-class, year-round conference venues, a dedicated on-site conference management team, a conveniently located headquarter hotel (Hilton Garden Inn Corvallis), plus many other on-campus partners.

- **OSU Conference Services** offers a full suite of services to ensure that every component of your conference, workshop or whatever the event, will be planned and executed with the

highest level of precision. Whether hosting your conference on-campus or elsewhere, as the client, you'll have the flexibility to focus on the strategic elements of your conference—leaving the details to our team of qualified event professionals.

- **The LaSells Stewart Center** welcomes more than 160,000 guests annually and proudly hosts hundreds of conferences and events each year. It has over 40,000 square feet of dedicated, year-round conference and performing arts space, including a 1,200 person auditorium, a 200 person lecture hall, plus an executive board room and several breakout rooms. The venue is complimented by high-tech audio visual capabilities and the largest art gallery in Willamette Valley.
- **CH2M HILL Alumni Center** is a beautiful meeting and conference venue that offers 40,000 square feet of dedicated, year-round event space. The center consists of a 7,000 square foot ballroom, a variety of breakout rooms, a stunning lobby and other multi-purpose areas.

University Conference Services
100 LaSells Stewart Center
875 SW 26th Street (located across from Reser Stadium)
Oregon State University
Corvallis, OR 97331
Website:
MeetatOSU.com

ADMINISTRATION

Kavinda Arthenayake,
Director, University Conference Services, Transportation Solutions, Printing & Mailing

The University Ombuds strengthens campus communication and administrative processes by acting as a designated neutral and dispute resolution practitioner. The Ombuds' major function is to provide informal, impartial, and confidential* assistance to the university community by listening to concerns, clarifying issues, exploring options for resolution, providing information and referrals, and if all parties agree, facilitating informal, non-binding mediation. Serving as a designated neutral, the ombuds is not an advocate for any individual or for the university, but rather acts as an advocate for fairness and healthy conflict management. The ombuds does not provide legal advice or psychological counseling. This position compliments,

but does not replace, the university's existing resources for conflict resolution.

To schedule an appointment, please contact the office by telephone or email. Walk-in appointments are welcome, however, scheduling appointments in advance is preferred to assure availability.

*Confidentiality cannot be promised in matters relating to threats to public safety, child abuse, if there is imminent risk of serious harm, or if compelled by a court of law. Speaking with an ombuds does not constitute legal notice to the university of any problem, concern, or complaint. You must pursue alternative complaint avenues if you wish to obligate the university to respond in any way. The ombuds has no duty or responsibility to report incidents to any person or authority, other than as described above.

University Ombuds
Waldo Hall 116
Oregon State
University
Corvallis, OR 97331
541-737-7029
Weekdays,
8:30 a.m.–5:30 p.m.
Website: <http://oregonstate.edu/ombuds/>

ADMINISTRATION

Sue Theiss,
Ombuds
sue.theiss@oregonstate.edu

Breanne Taylor,
Associate Ombuds
breanne.taylor@oregonstate.edu

Donetta Sheffold,
Ombuds Services
Coordinator
d.sheffold@oregonstate.edu

Oregon State University serves the state of Oregon, the nation and the world through teaching, research and outreach. The OSU Extension Service has a presence in 36 Oregon counties and delivers programs in agriculture, family and community development, forestry, Sea Grant and 4-H youth development. These units have a direct impact on Oregon's economy and the lives of Oregonians.

OSU Extended Campus provides a variety of high-quality learning opportunities to students throughout the world. Extended Campus gives access to Oregon State's academic excellence through OSU Summer Session and by delivering degree programs and courses online through OSU Ecampus.

OSU Professional and Continuing Education (PACE) offers an array of continuing education courses and programs, delivered in a variety of formats that benefit individuals and organizations alike in Oregon and elsewhere.

The Open Educational Resources and Emerging Technologies unit works with faculty to create open learning modules such as free online textbooks, enabling them to share their expertise in digital media collections around the world.

OSU EXTENDED CAMPUS

Dave King, *Associate Provost for University Outreach and Engagement*

Lisa L. Templeton, *Executive Director for OSU Extended Campus*
4943 The Valley Library
Corvallis, OR 97331-4504
541-737-9204
800-667-1465
Email: ecampus@oregonstate.edu
Website: <http://ecampus.oregonstate.edu>

ECAMPUS – ONLINE COURSES AND DEGREES

As the world of higher education increasingly gravitates toward online learning, Oregon State Ecampus continues to provide adult learners with access to a high-quality education no matter where they live. Thousands of online and distance students enroll in Ecampus' accredited degree programs and courses each year, all of which are developed by Oregon State University faculty.

OSU Ecampus consistently ranks among America's top providers of online education for the quality and strength of its programs. In each of the last four years, Ecampus has been ranked nationally by numerous publications such as U.S. News & World Report and SuperScholar. The national prestige is based on a variety of factors, including faculty credentials, student engagement, student services and academic quality.

Students interested in pursuing an OSU degree online with Ecampus can choose from more than 35 undergraduate and graduate programs, including fisheries and wildlife, an MBA in Executive Leadership, agricultural sciences, computer science, liberal studies, natural resources, psychology, and human development and family sciences. Find a complete list of degree programs online at <http://ecampus.oregonstate.edu>.

Ecampus delivers more than 900 online courses throughout the year. A complete list of classes is available online at <http://ecampus.oregonstate.edu/soc>.

Oregon State's distance learners include full- and part-time students, working and retired professionals, community college students, active-duty and retired military, high school students and individuals who want to further their education with a single college course. Ecampus students and graduates hail from all 50 states and more than 40 countries worldwide.

All curricula for Ecampus courses and degree programs are designed by Oregon State faculty and are held to the same rigorous academic standards as the university's on-campus classes. OSU is accredited by the Northwest Commission on Colleges and Universities, and all Ecampus students who complete degree requirements receive the same diploma and transcript as campus-based students.

Ecampus works closely with more than 500 OSU faculty members and department heads in order to provide students with enriching educational opportunities. Our current online offerings include courses in more than 80 subjects, from anthropology and chemistry to economics and public health.

Oregon State partners with nearly 20 community colleges throughout the state and in Hawaii as a way to help students progress toward a four-year degree. The Degree Partnership Program allows students to take community college and OSU classes concurrently in order to meet the course-load requirement for financial aid and to access other OSU services, including advising. Learn more about taking Ecampus online classes with the Degree Partnership Program at <http://oregonstate.edu/dpp>.

SERVICES FOR STUDENTS

There are a number of valuable resources distance students can take advantage of to improve their online-learning experience. The Ecampus librarian offers guidance to students as they conduct research, as well as access to a slew of community college and university libraries in the Pacific Northwest. Free online tutoring and remote test proctoring are also available.

The Ecampus staff also features several student success counselors, who help current and future Ecampus students explore issues that impact their academic success

**101 Ballard
Extension Hall
Corvallis, OR
97331-3606
541-737-2713
Website: <http://outreach.oregonstate.edu>**

Administration

A. Scott Reed,
Vice Provost for University Outreach and Engagement

Dave King,
Associate Provost for University Outreach and Engagement

Deborah Maddy,
Associate Provost for University Outreach and Engagement-OSU Extension Service

and identify strategies to support them in achieving their goals at OSU.

Ecampus works to create a sense of community for its students by sharing news about OSU faculty and students online (<http://ecampus.oregonstate.edu>) and in a series of e-newsletters. Ecampus also has a strong following on Facebook (<http://facebook.com/osuecampus>) and Twitter (<http://twitter.com/osuecampus>), where students can engage with fellow students, Beavers fans and ask questions of the Ecampus staff.

Ecampus also provides assistance via email (ecampus@oregonstate.edu), by phone (800-667-1465) or in person to prospects and students interested in taking Oregon State courses online and at a distance.

SERVICES FOR FACULTY

The Ecampus staff also provides an array of services for faculty, including course development training workshops, marketing support, facility coordination and liaison activities with partnering community colleges and universities.

The Ecampus Faculty Forum is an annual showcase of excellence in online teaching that features interactive, wide-ranging discussions on how OSU applies its academic prestige to online education. Held each spring on campus, the event gives faculty the opportunity to hear colleagues discuss innovative teaching methods, best practices and relate their experiences in online course development. More than 200 OSU faculty, administrators and staff attend the event annually.

In 2013 Ecampus launched an initiative called QM Online Course Design, which seeks to improve student success in online courses by focusing on continuously improving course design. Using the independent and research-based Quality Matters (QM) peer review process, the faculty-driven QM program examines course design, not the content itself or the teaching.

Having an online course peer reviewed is an ideal way for OSU faculty to receive fresh ideas from colleagues who can offer positive feedback to create more active learning. The Ecampus Course Development and Training team conducts trainings year-round, and stipends are awarded when one reviews a peer's course. Learn more online at <http://ecampus.oregonstate.edu/faculty/qm>.

OSU SUMMER SESSION

Claire Cross, *Director*

Maurine Powell, *Program Manager*

4943 The Valley Library
Corvallis, OR 97331-4504
541-737-1470
800-375-9359

Email: summer.session@oregonstate.edu
Website: <http://summer.oregonstate.edu>

OSU Summer Session serves more than 7,000 students annually on the Corvallis campus and at the OSU Hatfield Marine Science Center on the Oregon coast. Taking summer classes is an ideal way to expedite the journey to graduation. It allows students the ability to take classes that are difficult to get into during other terms, and it also gives students the opportunity to improve their GPA, perform research with faculty, and seek professional development or enrichment courses.

During summer term, Oregon State offers more than 1,700 on-site and online courses in over 100 subjects, from agriculture to zoology. Courses range in length from one week to 11 weeks, with most courses running three, four or eight weeks. Sequential courses (e.g. General Chemistry or Spanish) enable students to complete a full year's worth of courses in one term.

OSU Summer Session courses are held to the same rigorous academic standards as courses offered during the rest of the school year. Among the benefits of enrolling in summer term are the smaller class sizes and increased accessibility to instructors.

The full-time summer course load for undergraduates is 12 credits; for graduate students, it is 9 credits. Undergraduates may, however, take up to 19 credits, and graduate students can take up to 16 credits during summer term with advisor approval.

Nonresident students enjoy considerable tuition savings during summer term because all students pay in-state tuition.

Summer classes are open to all students who meet course requirements. Students who have been academically suspended from the university are ineligible to enroll in summer session. For application details, call the OSU Office of Admissions at 800-291-4192.

The OSU Summer Session Planning Guide, available in March, is the primary summer publication, and it contains important information regarding summer admission, registration procedures and deadlines, the summer calendar, tuition and fees, financial aid and housing. For a free copy of the planning guide, stop by the Office of the Registrar in the Kerr Administration building, the OSU Summer Session office on the fourth floor of The

Valley Library, or call 800-375-9359. For the most current information, go online to <http://summer.oregonstate.edu>.

Beginning in January, updated descriptions and schedule information for OSU Summer Session courses are available online at <http://summer.oregonstate.edu>. Please refer to this website, as course availability and offerings are updated through June.

OPEN EDUCATIONAL RESOURCES AND EMERGING TECHNOLOGIES (OER)

Dianna Fisher, *Director*

541-737-8658

Email: dianna.fisher@oregonstate.edu
Website: <http://outreach.oregonstate.edu/initiatives/oer>

The Open Educational Resources and Emerging Technologies unit guides faculty through the creation of open learning modules, enabling them to share their expertise around the world. In partnership with OSU Libraries and OSU Press, the OER team also creates interactive, free, online textbooks for students.

Examples of open educational resources (OERs) include full courses, course modules, syllabi, lectures, homework assignments, quizzes, classroom activities, pedagogical materials, games and more—all located in digital media collections around the world.

These learning modules are focused on defined, individual learning objectives and are available as a foundation for additional online course development, as well as for K–12 curriculum enhancement.

OSU EXTENSION SERVICE

A. Scott Reed, *Vice Provost for University Outreach and Engagement, Director Extension Service*

Deborah Maddy, *Associate Provost for University Outreach and Engagement, Associate Director Extension Service*

101 Ballard Extension Hall
Corvallis, OR 97331-3606
541-737-2713

Website: <http://extension.oregonstate.edu>

Oregon State University's Extension Service provides education and information based on timely research to help Oregonians solve problems and develop skills related to youth, family, farm, forest, and marine resources. It carries out its mission by extending the research and knowledge bases of the university to people who need the information, and provides leadership in applying this knowledge to the problems people have identified.

Anyone may participate in Extension offerings. Thousands of Oregon citizens

volunteer to assist in Extension programs by leading and teaching groups, responding to questions, and providing educational information. OSU students support their communities, gain practical experience and learn through Extension placements, applying academic learning to address local community needs.

Extension educational programs are developed in response to the needs of people in Oregon. Needs are identified by OSU Extension faculty, who are located throughout the state in county offices. Off-campus faculty, who work with people to assess their needs, partner with members of Extension's on-campus faculty to prepare and deliver useful educational programs. About two-thirds of OSU's Extension faculty and staff are located in offices off campus. Financial support is from county, state, and federal governments, grants, and other sources.

There are five major Extension education program areas:

Agricultural Sciences and Natural Resources

Extension's agricultural program provides education and technical assistance for people with agricultural interests. The major program emphasis is on food, feed, energy, fiber, seed, and ornamental production and management of animal and plant production systems. Programs include farm/ranch business management, marketing, value added processing, natural resource use and conservation, community horticulture, human and environmental health, and bioethics. Audiences include urban and rural residents and businesses, government agencies and communities with wide ranging interests in conservation, production, and community development.

Family and Community Health

Extension's Family and Community Health program helps Oregonians improve their health, family, and community through education and community partnerships. Major programming extends knowledge related to public health, nutrition, exercise science, human development, family financial management, and aging to address important needs in Oregon's communities.

Forestry and Natural Resources

Extension's Forestry and Natural Resources Program improves Oregonians' knowledge of forestry and natural resources and their options for enhancing benefits from these resources. This educational program assists forest owners, managers, processors, users, and students in understanding the importance of both production and environmental benefits from Oregon's forests. Priority subjects include reforestation, forest management, silviculture, forest health, wildland fire, intergenerational land transfer, harvesting and processing wood, protection

of soil and water, wildlife habitat, and related natural resources use, management, and protection.

Sea Grant Program

Extension's Sea Grant Program provides education, training, and technical assistance to people with coastal-related needs and interests. Major efforts are concentrated in the areas of fisheries and wildlife, watersheds and other natural resource management, marine engineering, food science and technology, economics, business, resource management, education, and recreation. The program is primarily supported by the OSU Sea Grant College and the OSU Extension Service.

4-H Youth Development

4-H helps young people learn and grow through an intentional process that builds competence, confidence, connection, compassion and character. Young people participate in 4-H through clubs, afterschool programs, camps, and school enrichment activities. These youth are supported by trained volunteers who work under the direction of local 4-H professionals located in all 36 counties. As the only nationwide youth development program with direct ties to the land grant university system, 4-H is uniquely positioned to ensure that its programs are based on what is known about how young people develop and learn.

OSU OPEN CAMPUS

A. Scott Reed, *Vice Provost for University Outreach and Engagement, Director Extension Service*

Jeff Sherman, *Open Campus and Special Initiatives*

101 Ballard Hall
Corvallis, OR 97331-3606
541-737-1384

Website: <http://outreach.oregonstate.edu/initiatives/open-campus>

OSU Open Campus is a shared initiative between OSU Ecampus, OSU Extension, local communities, led by the Division of Outreach and Engagement. In an effort to collaboratively engage community colleges, K-12 education, and universities, OSU convenes local educational teams to provide access to degree completion, career and college readiness, and professional and economic development.

Students and Faculty Engaging in Communities

Students and faculty who have interest in working with communities around the state can feel free to contact us for more information.

OSU PROFESSIONAL AND CONTINUING EDUCATION (PACE)

Dave King, *Associate Provost for University Outreach and Engagement*

Chris LaBelle, *Director of Professional and Continuing Education*

541-737-4197

800-667-1465

Website: <https://pace.oregonstate.edu/>

The OSU Professional and Continuing Education unit provides continuing education and professional development for professionals, hobbyists, organizations, associations and K-12 students throughout the state and beyond.

PACE works with colleges, businesses and professional associations to develop new onsite and online educational offerings in formats that include workshops, seminars, short courses, conferences and certificate programs; companies can request their own customized training as well.

PACE's growing list of courses and programs includes Master Gardener Online, Oregon Master Naturalist Online, Recycling 101, beer brewing and cider courses, the OSU Summer Chamber Music Workshop and many different certificate programs in areas such as horticulture, fashion design, digital brand management and communications, museum interpretation, integrated plant management and small farms. PACE also produces continuing education for pharmacists, veterinarians, hazardous waste professionals, beer brewers, naturalists, and many other professions.

Services for Students and Faculty

PACE works with works with colleges, departments and faculty to issue continuing education units (CEUs) and can assist with instructional design and program development, enrollment management, event management, mobile phone and web application development and videography for continuing education programs. PACE also provides assistance with grant writing and often partners with colleges or departments to provide an outreach vehicle for research in the form of an online continuing education program.

Contact us if you would like to discuss how your program might be adapted into an educational offering for professionals or lifelong learners.

Oregon State University offers academic Pathway and English language training programs through the INTO OSU Center. Personalized support tailored to international students' educational, social and cultural needs prepares them to progress with confidence as degree-seeking students. INTO OSU provides international students with learning experiences and services that promote academic, professional and personal success.

INTO established its first partnership in the U.S. at Oregon State University in 2008. Located in the new International Living-Learning Center, INTO OSU offers outstanding academic programs, technology-assisted learning, a welcoming, interconnected community of students from across the U.S. and the world, strong student support programs and state-of-the-art facilities. The innovative Pathway and English language programs offered at the INTO OSU Center are delivered by highly qualified OSU teaching faculty. INTO OSU also provides a breadth of academic preparation and support services designed specifically to meet the unique needs of its international students.

FACILITIES

The International Living-Learning Center opened in September 2011 and is the new home for INTO Oregon State University. This state-of-the-art building offers a world-class student experience where international and domestic students live and learn together in the heart of the OSU campus. The new building includes residential accommodations for more than 300 international and domestic students, 26 classrooms, a large and spacious auditorium, computer labs, a café, market and comfortable open spaces where students can socialize.

STUDENT SERVICES

The INTO OSU Student Services team provides a range of co-curricular programs and services promoting social, personal and academic wellbeing. Upon arrival at OSU, the team helps students settle in to life in Corvallis, provide social opportunities and a variety of resources tailored to the specific needs of international students. Whether it's a question about making an appointment with a doctor, finding a place to live, renewing your visa or anything else, there will always be someone available to help you.

INTERNATIONAL STUDENT ORIENTATION

Orientation involves a variety of important events that prepare students to be successful at OSU, including information about maintaining your visa status, registering for OSU classes, health requirements and insurance coverage. Attendance at International Student Orientation is required

of all international students, both direct and INTO OSU.

Other important activities during orientation include: opening an OSU email account, getting an OSU ID card, learning about OSU community expectations and taking a tour of the campus. It's also a great time to make new international and American friends and attend the many social events planned on campus.

VISA AND IMMIGRATION SUPPORT

Upon arrival, the university's International Student Advising and Services office, in conjunction with the INTO OSU Student Services team, will provide information, support and guidance on maintaining your immigration status while you are in the U.S. These can include questions about renewing a student visa, making sure your I-20 or DS-2019 status is always current, bringing your dependents, employment, traveling and more. They will issue any documentation you may need to support your visa application. Students can make individual appointments with an International Student Adviser at International Student Advising and Services. In addition, workshops are held throughout the year on topics such as employment, scholarships and travel.

OSU OFFICE OF INTERNATIONAL ADMISSIONS

The OSU Office of International Admissions is housed in the INTO OSU Center. The Office of International Admissions works closely with prospective international students from inquiry to admission for a variety of programs including: General English, Academic English, Pathway Programs (Undergraduate and Graduate), Undergraduate, Post-Baccalaureate, Professional (MBA, PharmD, and DVM), and Non-degree Exchange Students. All other graduate programs (Master's and PhD) are served by the Graduate School. Visit the Office of International Admissions online at <http://oregonstate.edu/admissions/international>.

SCHOLARSHIPS

Oregon State University and INTO Oregon State University are proud to offer a wide variety of scholarships for exceptional international students. Scholarships are available to undergraduate students, graduate students and Pathway students alike. For more information about these exciting scholarship opportunities, please visit <http://oregonstate.edu/admissions/international/scholarships>. Scholarships are available to undergraduate students, graduate students and Pathway and English language students.

UNDERGRADUATE PATHWAY

Undergraduate Pathway programs combine intensive language study, academic

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ADMINISTRATION

Amy McGowan,
Center Director

Bob Gilmour,
Director of Academic Programs

Valerie Rosenberg,
Director of International Undergraduate Admissions and Director, INTO OSU Student Experience

skills development and academic coursework in a carefully constructed program designed to prepare students for rigorous OSU degree programs.

Three types of Undergraduate Pathway programs are available:

- Standard 3-term Pathway: leads students through their first year and upon completion of all progression requirements, students will move on to their degree-seeking program as second-year, freshman students.
- 2-term Accelerated Pathway: This program is composed of two terms of Pathway programming which count toward the student's undergraduate degree.
- 1-term Accelerated Pathway: This program is composed of one term of Pathway programming which counts toward the student's undergraduate degree.

The Undergraduate Pathway programs are designed for students who:

- Want to study for an undergraduate degree in the U.S.
- Need to improve their English language skills
- May have lower GPAs than required of direct-entry students
- Desire additional academic, language, and cultural support in order to succeed during their first year at a U.S. university
- Any or all of the above

The Pathway program is for students who want to take the fast-track to success. Pathway students receive the highest level of support during their transition abroad, making it an ideal choice for international students who are driven to achieve high academic goals.

Undergraduate Pathway programs are available in:

- Business
- Engineering
- Science
- Computer Science
- Sustainable Planet
- Food Science and Technology
- Exercise Sport Science
- General
- General – Liberal Arts Focus
- Public Policy
- Women and Gender Studies

* Both the 1-term and 2-term Accelerated Pathway programs lead to any undergraduate major at OSU. No specific tracks are offered.

Pathway Program

Core Academic Courses

The Undergraduate Pathway program is comprised of OSU credit-earning courses in math, science and writing. From the first day of classes, INTO OSU Pathway students study alongside domestic students in many of the same courses.

For more information please visit into-higher.com/osu/programs.

GRADUATE PATHWAY PROGRAM

The innovative Graduate Pathway program is a pre-Master's program that provides international students a direct path to various graduate degrees at the university. The program gives students the academic foundation, essential language skills and GMAT/GRE test preparation to successfully move on to the Master's degree.

Direct admission to the Graduate School and respective department-based graduate programs at Oregon State University is highly competitive with only the best and most prepared students being selected. Many students who meet all the minimum entry requirements are not admitted because of the highly competitive nature of the programs.

The Graduate Pathway program is designed for international students who:

- Require additional preparation to be admitted directly to the Graduate School
- Fall short of meeting the minimum GPA or test score requirements
- Need further English development
- Need to improve study skills for success in their chosen field of study
- Any or all of the above

Graduate Pathway Programs are available in:

- Master of Business Administration (MBA)
- Chemical Engineering
- Civil Engineering
- Comparative Health Sciences
- Computer Science
- Construction and Engineering Management
- Electrical and Computer Engineering
- Environmental Engineering
- Industrial Engineering
- Mechanical Engineering
- Mechanical Engineering with Materials Science Emphasis

Three types of Graduate Pathway Programs are offered:

- Standard 3-term Pathway (available for any track offered)
- 2-term Accelerated Pathway (available for the MBA Pathway)
- 1-term Accelerated Pathway (available for the MBA and all Engineering Pathway programs)

CORE ACADEMIC COURSES

The academic courses included in the Graduate Pathway programs are carefully chosen to ensure success in graduate-level studies. Students will be advised on which modules to follow during their academic orientation at the INTO OSU Center.

For more information please visit into-higher.com/osu/programs.

ACADEMIC ENGLISH

Program Description

The Academic English program at INTO Oregon State University prepares international students for university study in the U.S. The academically rigorous program provides international students with high-quality English language instruction and the academic skills to succeed at OSU through development of:

- Listening
- Speaking
- Reading
- Writing
- Standardized test preparation
- Academic study skills

Program Highlights

- Intensive English to prepare for university study
- Academic advising throughout the program
- Small classes of 18-20 students
- Highly-trained and experienced instructors
- Participation in the Conversant Program
- Use of a fully-equipped Learning Center with state-of-the-art technology

Program Outcomes

After finishing this intensive program successful students will be able to:

- Interact comfortably in the U.S. classroom with professors and fellow students
- Understand U.S. values in an academic setting
- Present their spoken and written ideas accurately and effectively in English
- Write research papers with proper use of citations and references
- Use the Internet and OSU library databases to conduct academic research
- Read, understand, and critically evaluate academic texts
- Understand and use vocabulary common to academic disciplines
- Take useful and accurate notes in academic lectures and presentations
- Develop and deliver oral presentations

GENERAL ENGLISH PROGRAM

Program Description

The General English program consists of 5-week sessions designed for students of all levels of English who want to develop communication skills in many social and professional situations while learning about American culture.

Program Highlights

- English instruction for personal or employment motives
- Flexible entry dates
- Flexible duration of study
- Access to all OSU campus facilities and events

- Academic advising throughout the program
- Small classes of 18–20 students
- Use of a fully-equipped Learning Center with state-of-the-art technology

Program Outcomes

The General English program allows students to tailor their program to suit their personal, professional, and academic goals.

General English students will be able to:

- Improve general language proficiency in listening, speaking, vocabulary, reading and writing
- Expand career prospects by improving English language proficiency
- Develop conversation skills for real-world situations such as greeting, initiating a conversation, turn-taking, interrupting, asking for information
- Read and understand schedules, signs, ads and other authentic materials
- Understand basic cultural values and behaviors of Americans in order to interact appropriately
- Have the opportunity to interact with native speakers
- Progress to Academic English for further study at OSU

STUDY ABROAD WITH ENGLISH

Program Description

Study Abroad at INTO OSU is designed for students who want one or more terms of study abroad experience at a top US university. The program provides students with a classic American university experience while taking a variety of classes. Students will have access to all the support services available at the university and INTO OSU, including exceptional one-on-one tutoring, social and cultural trips and more.

The length of the Study Abroad program will vary depending on a student's needs. The program can be customized for different levels of English and for specific academic interests. There are fall, winter, spring and summer start dates available. Additional program and admission information can be found at <http://oregonstate.edu/admissions/international/programs/study-abroad-with-english>.

With prior approval from your home university, the academic courses you will study at OSU can be used to gain credits toward your undergraduate degree in your home country. This program is not designed as a route to degree-seeking OSU programs, though your credits may apply to an OSU degree if you seek admission.

This program consists of three parts:

Study Abroad with English (SAWE) Part 1

Students study full-time in the Academic English program. Students have an opportunity to progress to Study Abroad with English Part 2 upon successful completion of Academic English level 4 and meeting internal progression criteria.

Study Abroad with English (SAWE) Part 2

Students are able to select from OSU undergraduate credit bearing courses offered by the College of Liberal Arts and study alongside domestic and international students while continuing to take 6-12 hours of academic English classes. Students have an opportunity to progress to the Visiting International Students Program upon successful completion of Academic English core level 6 courses or ALS160/ALS162 and meeting internal progression criteria.

Visiting International Students Program (VISP)

Students can select from a range of OSU credit-bearing courses offered by the College of Liberal Arts. Optional academic English courses are also available.

All OSU undergraduate College of Liberal Arts courses taken through the VISP and SAWE Part 2 program are transferable with prior approval from the student's home university (except intensive English courses, if selected).

Departmental approval is required for students seeking to register for a course outside the College of Liberal Arts.

For a comprehensive list of all current youth programs at Oregon State University, please visit http://oregonstate.edu/precollege/main_view.

OFFICE OF PRECOLLEGE PROGRAMS

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Website: <http://oregonstate.edu/precollege/>

General Information: 541-737-9424

OSU's Precollege Programs offers a variety of on- and off-campus academic programs designed to enhance learning and introduce youth to the college community. During the summer months and throughout the academic year, K-12 students participate in programs that range from several hours to several weeks. Our Precollege Programs provide compelling experiences and stimulating learning environments for a diverse group of students.

OREGON 4-H

Offers a variety of educational opportunities for youths in grades K through 12. The program is part of the OSU Extension Service and is active in all Oregon counties. Opportunities for leadership development, community service, and learning about topics as diverse as natural resource management, foods and fibers, animal science, and engineering abound. All 4-H educational activities are designed to help participants develop lifelong skills that will prepare them for future success. To learn more about local opportunities, contact the OSU Extension office in your county or call the State 4-H Office at 541-737-4444 (HHHH).

TAG PROGRAMS

Specifically designed academic and social experiences for gifted, talented, and high-ability youth.

Adventures in Learning

Combines stimulating academic and

social opportunities in a fun-filled 10-day experience exposing participants to exciting and sophisticated areas of interest not usually available during the regular school year. The program is designed for gifted, talented and high-ability learners who have completed grades 5 or 6 and who are interested in fast-paced, challenging opportunities.

Expeditions

Provides gifted, talented, and high-ability youth who have completed grades 3 or 4 a two-week, half-day educational experience with courses taught by experts in a variety of topics. Students are introduced to engaging, intriguing subjects in an enjoyable and nurturing environment.

Outside the Box

Enables gifted, talented, and high-ability youth who have completed grades 7 or 8 to pursue topics of interest through a unique combination of in-depth, challenging academic explorations and social interaction with intellectual peers. Program participants can anticipate excitement, discovery, and challenge in the program's offerings which are designed specifically to address their interests and abilities.

Winter Wonderings

Offers a variety of challenging Saturday courses designed specifically for gifted, talented, and high-ability 3rd, 4th, 5th and 6th graders. Participants discover new and exciting areas of study in a fast-paced learning environment with their social and intellectual peers.

OSU KIDSPIRIT SUMMER DAY CAMPS

Sponsored by the College of Public Health and Human Sciences, is an innovative youth summer day camp program, offered Monday-Friday for children grades K through 12. Youth may attend morning, afternoon, or all day sessions. Programs are based on grade levels. All activities are coeducational. All abilities are welcome! Group leaders will help in classes and escort children to activity areas. Head instructors plan, organize and lead activities.

Junior Beavers

Grades K through 2, have an established daily program with variations in class offerings from session to session, including skill development and supplementation in recreational sports, art and educational classes.

Dam Builders

Grades 3 through 5, choose the groups of classes that they take from session to session. Classes to choose from include athletics, drama, art, science, music, computers and lots more!

Duck Busters

Grades 6 through 8, choose all of their classes from session to session. Their

classes are designed for their age group and skills. Classes include biking, rock climbing, triathlon, art, inventions and lots more!

Teen Leadership Camp

Grades 9 through 12, is for teens who want to develop their leadership skills by working with youth. They will be facilitated by a coordinator, become certified in First-Aid and Adult and Child CPR, and work directly with the KidSpirit campers by assisting group leaders and head instructors.

Counselors in Training

Grades 9 through 12, "CIT" is for teens who want to develop their leadership skills by working with youth, but will work with group leaders and head instructors. CIT teens will have more responsibilities and will be given more leadership opportunities.

Girls on the Run of the Willamette Valley

Girls on the Run, is a life-changing experiential learning program for girls in grades 3-5 and 6-8, that combines training for a 5K event with self-esteem enhancing work-outs. The fun, interactive curriculum is designed to educate and prepare preteen girls for a lifetime of self-respect and healthy living.

KIDSPIRIT SPORT PROGRAMS

KidSpirit offers a variety of recreation classes throughout the summer for participants ages 2-18. Classes include gymnastics, archery, and tennis. Each of our programs focus on obtaining basic skill sets while learning to interact with other participants in a fun, safe, and supportive environment.

SKIES (SPIRITED KIDS IN ENGINEERING AND SCIENCE)

Science and engineering activities for grades K through 5 where kids will explore chemistry, physics, math, life sciences, ecology and engineering in a fun, interactive learning environment. Science activities will be mixed with physical activities throughout the morning or afternoon session.

HIGH SCHOOL NEWSPAPER AND YEARBOOK WORKSHOP

High school juniors, seniors, and faculty advisors from Oregon, Washington, California, Alaska, and Idaho meet on the OSU campus for a three-day workshop. The annual event gives practical instruction in organization and development of high school newspapers and yearbooks. It is co-hosted by Josten's Yearbook Company, Northwest Scholastic Press, and the OSU Student Media Department. Classes are 8 a.m. to 5:30 p.m. daily. Last year's workshop attracted more than 275 participants.

JumpstART

A precollege visual arts summer residential program hosted by the School of Arts and Communication, JumpstART emphasizes skill development and conceptual growth through exposure to accelerated art instruction and faculty mentors. Students spend six hours daily working in art and design, attend evening presentations by guest lecturers and artists, and participate in multi-disciplined events. The workshop concludes with a final exhibition, as well as an evaluation of the student's portfolio by a faculty committee.

CAMPUS FIELD TRIPS PROGRAM

The Office of Precollege Programs hosts middle and high school visits to Oregon State University during the school year. Teachers and group leaders are encouraged to plan visits to explore careers, experience OSU, or enhance current curriculum. Register to request a visit using the Precollege website at <http://oregonstate.edu/precollege/>.

STEM ACADEMY@OSU

For more information, contact catherine.law@oregonstate.edu or STEM.academy@oregonstate.edu
Website: <http://academy.engr.oregonstate.edu>

STEM Academy@OSU offers educational enrichment opportunities that provide youth a direct connection to the STEM (Science, Technology, Engineering, and Math) fields. Programs include after-school girls' science and engineering clubs, summer day camps, workshops, and outreach programs. Classes are small, hands-on, informal, project-oriented, and open to all interested students. Tuition costs vary, depending on the program or activity.

SUMMER EXPERIENCE IN SCIENCE AND ENGINEERING FOR YOUTH (SESEY)

SESEY is primarily for high school girls and ethnic minorities traditionally under-represented in science and engineering, and for science, math, or physics teachers who are interested in developing curricular materials to promote engineering activities in their classrooms. Students come to the OSU campus for a one-week residential summer camp and are paired with a faculty mentor in engineering for a mini-research project in areas such as microscale technologies, plastics recycling, drug formulation and delivery, bioprocessing, microelectronics, and environmental engineering. There are also group learning activities (computer instruction, communication skills, field trips) and social activities. Students are exposed to science and engineering as viable and interesting career paths.

Career counseling is provided by faculty mentors and OSU graduate and undergraduate students who work with the students throughout the week as research project advisors and friends. Students live in OSU housing, so they receive a complete college experience. For more information, contact Skip Rochefort, skip.rochefort@oregonstate.edu.

SCIENCE AND MATH INVESTIGATIVE LEARNING EXPERIENCES (SMILE) PROGRAM

Ryan Collay, Director,
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Website: <http://smile.oregonstate.edu/>

OSU's SMILE (Science and Math Investigative Learning Experiences) Program collaborates with 15 school districts and charter school partners in Oregon to increase the number of historically under-represented minority, low-income, and other educationally underserved students who graduate from high school prepared to go on to college and pursue careers in math, science, engineering, health professions, and teaching. More than 600 students and 50 teachers in 34 schools across the state participated in SMILE last year. The program functions as a pipeline that takes students from 4th to 12th grade and on to postsecondary education in STEM programs and careers.

SMILE provides a comprehensive program of science and math enrichment and college readiness through weekly after-school clubs, field trips, on-campus college-connection challenge activities, a bridge-to-college summer program for SMILE graduates entering OSU, and professional development for classroom teachers serving as SMILE Club advisors.

ADDITIONAL YOUTH PROGRAMS:**BUG ZOO**

The Oregon State University Bug Zoo is a student group interested in educating its members, other students and the public about the joys and importance of insects, other arthropods and reptiles and amphibians. Bug Zoo educates through live displays and hands-on activities. For more information, contact Sujaya Rao, 541-737-9038, email: sujaya.rao@oregonstate.edu. Website: <http://entomology.oregonstate.edu/content/bugzoo>.

DISCOVERY DAYS

Discovery Days is an outreach program involving many of the science departments at OSU as well as departments and schools from the College of Agricultural

Sciences and the College of Engineering. This two-day event, held in both the fall and spring terms, features displays and hands-on activities from different departments that are suitable for all ages. For more information, contact Margie Haak, 541-737-6716, email: margie.haak@oregonstate.edu. Website: <http://www.science.oregonstate.edu/DiscoveryDays/>.

EDUCATION/K-12 OUTREACH/ CHEMISTRY OUTREACH

The Department of Chemistry has an active program to bring chemistry to the local community. Through the Outreach Committee, opportunities are available to tour labs, do hands-on experiments, and have chemistry faculty and students to bring chemistry to schools. For more information, contact Margie Haak, 541-737-6716, email: margie.haak@oregonstate.edu. <http://www.chem.orst.edu/outreach/>.

INNER CITY YOUTH INSTITUTE (ICYI)

ICYI is a collaborative partnership among the OSU College of Public Health and Human Sciences, Forest Service, Pacific Northwest Research Station, and Bureau of Land Management. The program encourages urban youth to explore careers in natural resources, attain higher education in natural resource careers and understand the interrelationships between the use of natural resources, the people who use them and the land that sustains their community. For more information, visit <http://extension.oregonstate.edu/metro4h/icyi> or contact Stacey Sowders, Program 4-H ICYI Program Coordinator: 503-821-1125.

OREGON NASA SPACE GRANT

Oregon NASA Space Grant maintains a diverse array of programs to support space science and engineering education. Connecting educators with professional development opportunities, Oregon Space Grant aims to help develop a strong science, mathematics, and technology education base at all levels while fostering communication and continuity between the K-12 community and higher education. For more information, contact Oregon NASA Space Grant at 541-737-2414, email: spacegrant@oregonstate.edu. Website: <http://spacegrant.oregonstate.edu/>.

OREGON WOOD MAGIC™

Oregon Wood Magic™ is a 2 hour 45 minute interactive experience designed to educate elementary school teachers and their students about the wonders of wood as a material. For more information, visit <http://woodscience.oregonstate.edu/wood-magic/oregon-wood-magic> or call Michelle Maller, 541-737-4259, Wood Magic Coordinator, michelle.maller@oregonstate.edu.

OSU SUMMER VETERINARY EXPERIENCE

The OSU Summer Veterinary Experience is a hands-on learning experience for academically talented, low-income and minority high school students interested in veterinary medicine. Mentors and instructors will work with each student to discover and explore her or his talents and understanding of the basic sciences, animal and human health, and social sciences. For more information, visit <http://vetmed.oregonstate.edu/youth-summer-program>, or contact Aarika Guerrero, 541-737-2268, aarika.guerrero@oregonstate.edu.

PET DAY AND OPEN HOUSE

Pet Day and Open House provides outreach and information about veterinary science, and careers in veterinary science and animal care. It is open to the general public the first Saturday in May at Magruder Hall on campus. For more information, contact Suzanna Chase, suzanna.chase@oregonstate.edu, 541-737-6779. Website: <http://vetmed.oregonstate.edu/pet-day>.

RECRUITMENT AND RETENTION OF WOMEN AND MINORITIES IN ENGINEERING

Committed to bringing more woman and minorities to OSU to become tomorrow's engineers through our three pronged approach of Recruitment, Retention and Research. Activities include K-12 school visits, sponsoring teacher/career counselor workshops, OSU Engineering tours, developing lesson plans for K-12 classes. For more information, contact Ellen Momsen, 541-737-9699, email: ellen.momsen@oregonstate.edu. Website: <http://engr.oregonstate.edu/wme/>.

SCIENTISTS AND TEACHERS IN EDUCATION PARTNERSHIPS (STEPS)

Scientists and Teachers in Education Partnerships (STEPS) The STEPs program is a STEM outreach program at Oregon State University which strives to enhance 6-12 science, math, health, and engineering education by forging collaborative partnerships between Oregon scientists, teachers, and students. This goal is accomplished through activities such as teacher workshops, science events for students, and classroom equipment loans. Website: <http://steps.oregonstate.edu>. For more information, Kari van Zee vanzeek@science.oregonstate.edu; Dan Arp, Director, Dan.J.Arp@oregonstate.edu.

SUITCASE OCEANOGRAPHY

Suitcase Lessons are portable modules for K-6 students based on the FOSS science curriculum. They are designed with complete materials and instructions so any member of the OSU oceanography faculty, graduate student, or a scientist working at an oceanography institute can go to a classroom and successfully present the lessons. These kits can be checked out from CEOAS. Outreach opportunities include developing more lessons or creating suitcase lessons of your own. For more information, contact Marta Torres, 541-737-2902, email: mtorres@coas.oregonstate.edu. Website: <http://blogs.oregonstate.edu/suitcase/>.

WAVE RESEARCH LABORATORY TOURS

The O.H. Hinsdale Wave Research Laboratory strives to expose students of all ages to engineering and research with programs such as guided tours through the wave lab. The tours, guided by knowledgeable faculty and graduate students, include an introduction to basic wave mechanics, demonstrations of the wave lab equipment and experiments being conducted in the laboratory. Tours can range from 20 to 45 minutes and the WRL will work with teachers to develop meaningful and exciting lesson plans for the tour. For more information, contact Alicia Lyman-Holt, 541-737-3665, email: alicia.lyman-holt@oregonstate.edu. Website: <http://wave.oregonstate.edu/>.

The College of Agricultural Sciences performs four vital services—teaching, research, extension, and international agriculture—that are closely tied to the human and natural resources of the state of Oregon and that support the economic, environmental, and community welfare of the state, the Pacific Northwest, the nation, and the world.

The College of Agricultural Sciences offers educational programs to serve the needs of individuals interested in pursuing careers in agribusiness; agriculture; animal, plant and food systems; environmental economics and policy; fisheries and wildlife; food science; range and natural resource management; veterinary medicine; and more. The faculty realizes the importance of individual aims and abilities and, through course work, internships, advising, and extracurricular activities, tries to help each student discover and develop social, aesthetic, and ethical values as well as professional competence.

Undergraduate students may pursue the following bachelor of science degree programs through the College of Agricultural Sciences:

- Agricultural Business Management
- Agricultural Sciences
- Animal Sciences
- Bioresources Research
- Botany
- Crop and Soil Science
- Environmental Economics and Policy
- Fisheries and Wildlife Sciences
- Food Science and Technology
- Horticulture
- Rangeland Sciences
- Sustainability

Graduate students may pursue the following degree programs:

- Agricultural Education (MAG, MS)
- Animal Science (MAG, MS, PhD)
- Applied Economics (MA, MS, PhD, MAIS)
- Biological and Ecological Engineering (MEng, MS, PhD)
- Botany and Plant Pathology (MA, MAG, MS, PhD)
- Crop Science (MAG, MS, PhD)
- Entomology (MA, MAG, MS, PhD)
- Fisheries Science (MAG, MS, PhD)
- Food Science and Technology (MAG, MS, PhD)
- Horticulture (MAG, MS, PhD)
- Interdisciplinary Studies (MAIS)
- Public Policy (MPP)
- Rangeland Ecology and Management (MAG, MS, PhD)
- Soil Science (MAG, MS, PhD)
- Toxicology (MAG, MS, PhD)
- Water Resources Engineering (MS, PhD)
- Water Resources Policy and Management (MS)
- Water Resources Science (MS, PhD)
- Wildlife Science (MAG, MS, PhD)

DOUBLE DEGREES IN EDUCATION OR INTERNATIONAL STUDIES OR SUSTAINABILITY

Undergraduates with majors in the College of Agricultural Sciences can earn a second degree in education or international studies or sustainability. See the College of Education or International Programs or Sustainability major sections of this catalog for more information.

HIGH SCHOOL PREPARATION

Advances in the technology and sciences of agriculture and natural resources make the study of biological, physical, and social sciences and communications vital. High school agricultural science and technology (AST) courses also help prepare students for some fields of study. The following preparation in high school is strongly recommended for students who plan to enter a College of Agricultural Sciences degree program: English, 4 units; mathematics, 3 units; physics, chemistry, and biology, 1 unit each; social studies, 3 units; and foreign language, 2 units.

INDIVIDUAL ADVISING

Each student is considered an important individual. His or her study program is developed in personal consultation with an advisor in the department of his or her major interest. As early as possible, each student is encouraged to select a subject area and become associated with instructors and other students with similar interests. Initial or early advising is based upon the student's high school record and placement test scores. When high school preparation is found to be inadequate, the student is encouraged to enroll in courses providing the education, training, and experience necessary to help assure success at the university level, even though such work may require the student to take one or more additional terms to complete a prescribed four-year curriculum. Students planning to transfer from a community college or another four-year institution are encouraged to contact an advisor to discuss their plan of study as far in advance of transferring as possible.

INTERNSHIPS

College of Agricultural Sciences departments and programs offer academic credit for learning achieved during supervised work experience. Internships are available in all facets of agriculture and natural resources through individual departmental offerings. Applications for internships must be approved prior to placement. Details are available from departmental advisors.

SCHOLARSHIPS

The College of Agricultural Sciences and its departments offer a variety of scholarships to deserving students. Several are reserved for incoming high school or transfer students. Additional information and application forms for college-level scholarships are available online at <http://agsci.oregonstate.edu/scholarships>. For information about departmental scholarships, contact each department directly. For more information about university-level scholarships, contact the Office of Financial Aid and Scholarships, 541-737-2241.

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MINOR PROGRAMS

Minors are offered through most departments of the College of Agricultural Sciences. Students interested in pursuing a minor must first contact the key advisor in the area of interest. The minor must consist of a minimum of 27 designated credits of related course work, including 12 in upper-division courses.

GRADUATION REQUIREMENTS

To be eligible for a bachelor of science (BS) degree, a student must complete a minimum of 180 credits including:

1. University Baccalaureate Core requirements
2. Courses in agricultural sciences: 36 credits including 24 credits at the upper-division level.

COLLEGE OF AGRICULTURAL SCIENCES COURSES

AGRI 299 SPECIAL TOPICS (1-4). Targeted courses that focus on specific topics in agriculture and natural resources. Topics may vary from term to term and from year to year. May be repeated for credit when topics differ. This course is repeatable for a maximum of 8 credits.

AGRI 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

COLLEGE OF AGRICULTURAL SCIENCES INTERDISCIPLINARY PROGRAMS

BIORESOURCE RESEARCH PROGRAM

Kate Field, Director
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E-mail: BRR@oregonstate.edu
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Undergraduate Major**Bioresource Research (BS, CRED, HBS)****Options**

Animal Reproduction and Development
Applied Genetics
Bioenergy
Bioproducts
Biotechnology
Climate and Biosystems Modeling
Environmental Chemistry
Food Quality
Genomics/Bioinformatics
Pest Biology and Management
Plant Growth and Development
Sustainable Ecosystems
Toxicology
Water Resources

**Undergraduate Minor
Bioenergy**

Bioresource Research is an interdisciplinary biosciences major leading to a BS degree. The centerpiece of BRR is a comprehensive mentored research experience. BRR students take foundation courses in the biological and physical sciences. Each student's upper-division curriculum is individualized based on choice of option and research topic. All BRR students do a two-year, mentored research project culminating in a thesis, in a cutting-edge area of agricultural, biological, chemical, environmental, food, or health science. BRR faculty research mentors currently come from seven OSU colleges (Agricultural Sciences; Engineering; Earth, Ocean, and Atmospheric Sciences; Forestry; Pharmacy; Science; and Veterinary Medicine). BRR courses include classes in scientific research, data presentation, and seminar presentation. The BRR curriculum is flexible enough to allow students to complete a second major or minor related to their research interests.

In addition to research expertise, BRR students graduate with a strong background in biosciences, job training, and problem-solving and communication skills. Many will enter industrial or academic research or natural resource management. Others will enter graduate and professional schools in the life sciences or become secondary school science teachers. The BRR program fulfills requirements for entry to medical, veterinary, dental and related biomedical schools and graduate programs.

BIORESOURCE RESEARCH (BS, CRED, HBS)**Sample Curriculum****First Year (45)**

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)
BRR 100. Great Experiments in Bioresource Sciences (1)
CH 231, CH 232, CH 233. *General Chemistry (4,4,4)
and CH 261, CH 262, CH 263.
*Laboratory for Chemistry 231, 232, 233 (1,1,1)
HHS 231. *Lifetime Fitness for Health (2)
HHS 241-HHS 248. *Lifetime Fitness: (various activities) (1)
or any PAC Course (1-2)
WR 121. *English Composition (3)
Baccalaureate core (6)
Unrestricted electives (5)

Second Year (45)

BRR 200. Developing a Research Proposal: Theory and Practice (1)
PHL 205. *Ethics (4)
CH 331, CH 332. Organic Chemistry (4,4)
CH 337. Organic Chemistry Lab (4)
PH 201, PH 202, PH 203. *General Physics (5,5,5)

ST 351. Introduction to Statistical Methods (4)
Baccalaureate core selection (6)
Unrestricted electives (3)

Third Year (45)

BI 311. Genetics (4)
BRR 401. Research and Scholarship (8)
COMM 111. *Public Speaking (3)
MTH 251. *Differential Calculus (4)
MTH 252. Integral Calculus (4)
or MTH 268. Mathematical Ideas in Biology (4)
Baccalaureate core selection (3)
Unrestricted electives (4)
Selected courses to meet BRR option requirement (15)

Fourth Year (45)

BB 450, BB 451. General Biochemistry (4,3)
BRR 401. Research and Scholarship (6)
BRR 403. ^Thesis (4)
BRR 406. Projects: Data Presentations (1)
BRR 407. Seminar (1)
BRR 409. Practicum: Teaching and Peer Mentoring (1)
WR 327. *Technical Writing (3)
Baccalaureate core selection (3)
Unrestricted electives (5)
Selected courses to meet BRR option requirement (14)

Options Curricula

One option specialization is required (more are often possible). Course work for EACH option must total 29 credits.

Footnotes:

* Baccalaureate Core Course
^ Writing Intensive Course (WIC)

OPTIONS**ANIMAL REPRODUCTION AND DEVELOPMENT OPTION**

Animal reproduction and development entails the study of life processes in cells, organs, and whole animals to enhance efficient production of high quality animals and animal food products. Students use antibody based assays, molecular genetics, protein chemistry, embryo and tissue culture, electron chemistry, and other modern laboratory techniques in research in areas of animal reproduction, development and growth, preparing them for positions or graduate programs in the bioscience/biomedical/veterinary/agricultural fields.

Required Courses

ANS 121. *Introduction to Animal Sciences (4)
ANS 314. Animal Physiology (4)
ANS 316. Reproduction in Domestic Animals (4)
ANS 317. Reproduction in Domestic Animals Lab (1)
CSS/CROP/HORT 300. Crop Production in Pacific Northwest Agroecosystems (4)
Select one of the following courses:
BI 314. Cell and Molecular Biology (4)
BOT 331. Plant Physiology (4)
CSS 305. Principles of Soil Science (4)
[Taught at EOU LaGrande campus only.]

and CSS 306. Problem Solving: Soil Science (1)[*Taught at EOU LaGrande campus only.*]

or SOIL 205. *Soil Science (4)

ENT 311. Introduction to Insect Pest Management (4)

or CSS 311. Introduction to Insect Pest Management (5)[*Taught at EOU LaGrande campus only.*]

MB 302. General Microbiology (3)

RNG 341. Rangeland Ecology and Management (3)

TOX 411. Fundamentals of Toxicology (3)

Specialization and Breadth Courses
7 to 9 credits approved by option faculty and research mentor.

Total=29

APPLIED GENETICS OPTION

Applied genetics is directed at changing the genomes of organisms, to increase their utility to humans. Techniques are derived from cytogenetics, molecular biology, and Mendelian and quantitative genetics. Typically, applied geneticists have expertise in one or more related fields of study such as agronomy, biochemistry, botany, entomology, food processing, forestry, microbiology, pathology, physiology, and statistics. The goals of applied genetics include:

1. improving the quality of food and fiber products,
2. improving the cost efficiency of a given product, and
3. minimizing adverse environmental effects of food or fiber production.

Students in this option will be well prepared for positions in biosciences and agriculture, or in graduate and professional programs.

Required Courses

CSS/PBG 430. Plant Genetics (3)

and CSS/PBG 450. Plant Breeding (4)

or ANS 378. Animal Genetics (4)

ST 411. Methods of Data Analysis (4)

Specialization and Breadth Courses
18 to 21 credits approved by option faculty and research mentor.

Total=29

BIOENERGY OPTION

Bioenergy is renewable energy (e.g. fuel ethanol, hydrogen and biodiesel) derived from biomass, including byproducts, residues, woody waste products, and crops and microbes grown specifically for fuel. Development and production of bioenergy could contribute to long-term environmental and economic sustainability. Bioenergy research creates new uses for agricultural and other materials by developing new biochemical processes for the production of sustainable fuels. This area of research involves both science and engineering. Students completing this option will be ready for challenging careers in industry, governmental agencies, consulting companies, and

novel start-up companies, or for graduate programs.

Substituted Courses

BRR 350. Introduction to Regional Bioenergy (2) for BRR 100 and BRR 409

BRR 450. Interdisciplinary Research: Bioenergy Focus (2) for BRR 200

Required Courses

1. Background Course

Choose one course from below (3 cr):

CSS/CROP 330. *World Food Crops (3)

FOR 111. Introduction to Forestry (3)

MB 302. General Microbiology (3)

2. Upper-Division Lab Course

Choose one course from below (2–3 cr):

BB 493. Biochemistry Laboratory (3)

BB 494. Biochemistry Laboratory (3)

BOT 332. Laboratory Techniques in Plant Biology (3)

MB 303. General Microbiology Laboratory (2)

3. Engineering Course

Choose one course from the list, or another appropriate upper-division course in the area of process or ecological engineering, genomics/bioinformatics, or genetic engineering, approved by research mentor (3–4):

BEE 102. Ecological Engineering II (3)

BEE 320. Biosystems Analysis and Modeling (4)

BEE 453. Introduction to Process Engineering Design (4)

BOT 475. Comparative Genomics (4)

4. Specialization and Breadth Courses

WSE 473. Bioenergy and Environmental Impact (3)

Choose additional courses from above and below, or other upper-division courses approved by research mentor, to total 29 credits:

AREC 300. Applied Economic Analysis (3)

AREC 351. *Natural Resource Economics and Policy (3)

AREC/ECON 352. *Environmental Economics and Policy (3)

BEE 221. Fundamentals of Ecological Engineering (3)

Note: Students choosing BEE 221 may substitute it for BEE 102.

BEE 499. Special Topics: *Biofuel Feedstocks and Production* (3)

BI 314. Cell and Molecular Biology (4)

BI/FES/TOX 435. *Genes and Chemicals in Agriculture: Value and Risk (3)

ECON 201. *Introduction to Microeconomics (4)

ENGR 231 Understanding Energy (3)

ENGR 350. *Sustainable Engineering (3)

ENGR 363 *Energy Matters (3)

FOR 330. Forest Conservation Economics (4)

FOR 331. Forest Resource Economics II (4)

FS 432. Planning Agroforestry Projects (2)

MB 310. Bacterial Molecular Genetics (3)

MB 312. Bacterial Physiology and Metabolism (3)

MB 456. Microbial Genetics and Biotechnology (3)

MB/FST 479. Fermentation Microbiology (3)

MTH 254. Vector Calculus I (4)

MTH 256. Applied Differential Equations (4)

PHAR 536. Product Development (3)

PHAR 537. Bioorganic Chemistry (3)

PHAR 540. Medicinal Natural Products Chemistry (3)

WR 201. *Writing for Media (3)

WR 214. *Writing in Business (3)

WSE 210. *Renewable Materials Technology and Utilization (4)

WSE 321. Chemistry of Renewable Materials (4)

WSE 322. Physical and Mechanical Properties of Renewable Materials (4)

WSE 324. Renewable Materials Laboratory (3)

WSE 453. ^Global Trade in Renewable Materials (3)

WSE 535. Polymer Synthesis and Structure (3)

WSE 573. Bioenergy and Environmental Impact (3)

Total=29

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

BIOPRODUCTS OPTION

Bioproducts are biomaterials or biochemicals (e.g. biodegradable plastics and composites, antibiotics, pharmaceuticals and herbicides) produced by conversion processes from plant, animal, or microbial biomass. Development and production of bioproducts contribute to environmental and economic sustainability. Bioproducts research creates new uses for agricultural and other materials by developing new biochemical processes for the production of renewable chemicals and bioproducts. This area of research involves both science and engineering. Students completing this option will be ready for challenging careers in industry, governmental agencies, consulting companies, and novel start-up companies, or for graduate programs.

Students must choose option classes from three categories, to provide:

1. background appropriate to the systems that their research concerns (e.g., forests, agricultural crops, microbes);
2. an upper-division laboratory class;
3. appropriate "engineering" course work, broadly defined to include process engineering, ecological engineering, bioinformatics, breeding, or genetic engineering, depending on the student's choice of research.

1. Background Course

Choose one course from below (3 cr):

CSS/CROP 330. *World Food Crops (3)

FOR 111. Introduction to Forestry (3)

MB 302. General Microbiology (3)

2. Upper-Division Lab Course

Choose one course from below (2–3 cr):

- BB 493. Biochemistry Laboratory (3)
 BB 494. Biochemistry Laboratory (3)
 BOT 332. Laboratory Techniques in Plant Biology (3)
 MB 303. General Microbiology Lab (2)

3. Engineering Course

Choose one from the list, or another appropriate upper-division course in the area of process or ecological engineering, genomics/bioinformatics, or genetic engineering, approved by research mentor (3–4):

- BEE 102. Ecological Engineering II (3)
 BEE 320. Biosystems Analysis and Modeling (4)
 BEE 453. Introduction to Process Engineering Design (4)
 BOT 475. Comparative Genomics (4)
 ENGR 350. *Sustainable Engineering (3)

4. Specialization and Breadth Courses

Choose 19–21 credits from above and below, or other upper-division courses approved by research mentor, to total 29:

- AREC 300. Applied Economic Analysis (3)
 AREC 351. *Natural Resource Economics and Policy (3)
 AREC/ECON 352. *Environmental Economics and Policy (3)
 BEE 221. Fundamentals of Ecological Engineering (3)
Note: Students choosing BEE 221 may substitute it for BEE 102.
 BEE 499. Special Topics: *Biofuel Feedstocks and Production* (3)
 BI 314. Cell and Molecular Biology (4)
 BI/FES/TOX 435. *Genes and Chemicals in Agriculture: Value and Risk (3)
 ECON 201. *Introduction to Microeconomics (4)
 ENGR 363. *Energy Matters (3)
 FOR 330. Forest Conservation Economics (4)
 FOR 331. Forest Resource Economics II (4)
 FS 432. Planning Agroforestry Projects (2)
 MB 310. Bacterial Molecular Genetics (3)
 MB 312. Bacterial Physiology and Metabolism (3)
 MB 456. Microbial Genetics and Biotechnology (3)
 MB/FST 479. Fermentation Microbiology (3)
 MTH 254. Vector Calculus I (4)
 MTH 256. Applied Differential Equations (4)
 PHAR 536. Product Development (3)
 PHAR 537. Bioorganic Chemistry (3)
 PHAR 540. Medicinal Natural Products Chemistry (3)
 WR 201. *Writing for Media (3)
 WR 214. *Writing in Business (3)
 WSE 210. *Renewable Materials Technology and Utilization (4)
 WSE 321. Chemistry of Renewable Materials (3)
 WSE 322. Physical and Mechanical Properties of Renewable Materials (4)

- WSE 324. Renewable Materials Lab (3)
 WSE 453. ^Global Trade in Renewable Materials (3)
 WSE 535. Polymer Synthesis and Structure (3)
 WSE 573. Bioenergy and Environmental Impact (3)

Total=29**Footnotes:**

- * Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

BIOTECHNOLOGY OPTION

Biotechnology refers to laboratory-based techniques such as genetic engineering, recombinant DNA, tissue culture, and horizontal gene transfer, to make or modify products, to improve plants or animals, or to develop useful microorganisms. Examples include gene transfer to increase plant yield or disease resistance; cell and tissue culture to clonally propagate plants or animals; manipulation of microorganisms or cultured cells for the production of fermented food and beverages or the development of vaccines; production of antibodies for detection of animal and plant diseases; drug discovery and development. Students will gain laboratory and/or field experience in modern techniques of biotechnology, preparing them for biosciences or biomedical graduate/professional schools or careers in biotechnology.

Substituted Courses

- BB 490 and BB 491. Biochemistry (3,3)
 for BB 450 and BB 451. Biochemistry (4,3)

Required Courses

- BB 492. Biochemistry (3)
 BI 314. Cell and Molecular Biology (4)
 MB 302. General Microbiology (3)
 and MB 303. General Microbiology Lab (2)
 or HORT/PBG 441. Plant Tissue Culture (4)
 MB 310. Bacterial Molecular Genetics (3)

Specialization and Breadth Courses

13 to 15 credits approved by option faculty and research mentor.

Total=29**CLIMATE AND BIOSYSTEMS MODELING OPTION**

The Climate and Biosystems Modeling option applies general systems theory to the analysis of climate, environmental and agricultural systems, and their interactions. Systems theory provides a method of analyzing overall system behavior by examining the relations among—and the behavior of—individual components, and synthesizing these relationships into a mathematical framework that describes the total system. Computer simulation using this mathematical framework can predict and analyze the response to various changes in the inputs to, and/or structure of, the system, providing a powerful tool for the development of comprehensive solu-

tions to problems. Examples of topics for student research could include studying the effects of climate change on vectored disease transmission, marine biodiversity, distributions of crops and crop pathogens, the carbon and nitrogen cycles, and wildfire cycles. The option is flexible; students design personalized programs and may complete a double major or minor if desired. This option will prepare students for challenging careers in governmental regulatory agencies and environmental consulting companies, or for graduate programs.

BRR students interested in climate and/or ecosystem research but not modeling should investigate the Sustainable Ecosystems option.

Required Courses**1. Climate**

Choose one course from below (3–4 credits):

- ATS 420. Principles of Climate (4)
 GEO 323. ^Climatology (4)

2. Biosystems

Choose one from below or another appropriate course approved by research mentor (3–4 credits):

- ATS 464X. Vegetation and the Atmosphere (3)
 BI 370. Ecology (3)
 BOT 341. Plant Ecology (4)
 CE 412. Hydrology (4)
 FE 430. Watershed Processes (4)
 FES 341. Forest Ecology (3)
 FW 320. Introductory Population Dynamics (4)
 OC 440. Introduction to Biological Oceanography (3)

3. Quantitative Modeling

Choose one course from below (3–4 credits):

- BEE 320. Biosystems Analysis and Modeling (4)
 ST 435. Quantitative Ecology (3)
 ST 443. Applied Stochastic Models (3)

4. Computer Programming

Choose one course from below or another appropriate course approved by research mentor (3–4 credits):

- CS 151. Introduction to C Programming (4)
 CS 161. Introduction to Computer Science I (4)

5. Statistics

Choose one sequence from below (8 credits):

- ST 411, ST 412. Methods of Data Analysis (4,4)
 ST 421, ST 422. Introduction to Mathematical Statistics (4,4)

Specialization and Breadth Courses
 6 to 9 credits approved by research mentor.

Total=29 credits**Footnote:**

- ^ Writing Intensive Course

ENVIRONMENTAL CHEMISTRY OPTION

Environmental chemistry focuses on the basic principles that control the fate of chemicals in the environment. A bewildering variety of chemicals, an inevitable result of modern industrial civilization, are released daily; some of them persist in soil, water, or air. The extent to which these chemicals are a health hazard depends in part on where, how much, and in what form they accumulate. OSU scientists use state-of-the-art methods to detect trace amounts of chemicals in the environment, at levels as low as one part per trillion, and track their movement and transformations. Students will acquire laboratory skills that will be in high demand as worldwide public concern with environmental quality increases.

Substituted Courses

CH 334, CH 335, CH 336. Organic Chemistry (3,3,3)

for CH 331, CH 332. Organic Chemistry (4,4)

PH 211, PH 212, PH 213. *General Physics with Calculus (4,4,4)

for PH 201, 202, 203. *General Physics (5,5,5)

Required Courses

CH 390. Environmental Chemistry (3)

CH 440. Physical Chemistry (3)

CSS 305. Principles of Soil Science (4)

and CSS 306. Problem Solving: Soil Science Applications (1)*[CSS taught only on EOU LaGrande campus]*

or SOIL 205. *Soil Science (4)

MTH 254. Vector Calculus I (4)

Select two courses from:

CH 324. Quantitative Analysis (4)

CH 421. Analytical Chemistry (3)

CH 428. Instrumental Analysis (4)

CH 435. Structural Determination by Spectroscopic Methods (3)

CH 440. Physical Chemistry (3)

CH 461. Experimental Chemistry II (3)

CSS/SOIL 545. Geochemistry of Soil Ecosystems (4)

TOX 430. Chemical Behavior in the Environment (3)

TOX 490. Environmental Forensic Chemistry (3)

Specialization and Breadth Courses
5 to 8 credits approved by option faculty and research mentor.

Total=29 (not including substitute courses)

FOOD QUALITY OPTION

Food quality research includes a broad range of studies involving sensory appeal, convenience, safety, and nutrition of food and beverages. The sensory aspects of food quality emphasize taste, texture, aroma, and appearance. The convenience aspects of food quality include shelf-life, ease of preparation, and improved functional properties. Food safety is concerned with acute and chronic responses of consumers to microorgan-

isms and chemicals that occur naturally or are added to foods. Nutritional aspects of food quality are related to the nutrient content of foods and the role of nutrients in human health. Research in these areas is grounded in the application of basic sciences, including biology, chemistry, microbiology, molecular biology, psychology and engineering. Students will acquire skills appropriate for laboratory, industrial, or regulatory positions.

Required Courses

FST 421. Food Law (3)

FST 422. Food Chemistry Fundamentals (4)

FST 423. Food Analysis (4)

MB 302. General Microbiology (3)

Specialization and Breadth Courses

14 credits approved by option faculty and research mentor.

Total=29

GENOMICS/BIOINFORMATICS OPTION

Technological advances in the life sciences have led to a virtual explosion of genomics, proteomics, metabolomics and related “omics” data that give unprecedented global and molecular views of living systems. The Genomics/Bioinformatics Option focuses on computational analyses of these data, using state-of-the-art methods. Computational areas of emphasis within this option include sequence (DNA and protein) analysis and alignment, biological network analysis, and quantitative modeling. Students will be able to use these data to answer research questions and address emerging applications in life sciences, biotechnology, and medicine, and will be prepared for careers or graduate programs in this new, rapidly growing field.

Required:**Biochemistry/Molecular Biology:**

Choose one course from below:

BB 331. *Introduction to Molecular Biology (3)

BI 314. Cell and Molecular Biology (4)

Computer Science:

Choose either:

BOT 476. Introduction to Computing in the Life Sciences (3)

or

CS 161, CS 162. Introduction to Computer Science I, II (4,4)

and MTH 231. Elements of Discrete Mathematics (4)

Genomics and Bioinformatics

BB 499. Special Topics: Nucleic Acid Bioinformatics (3)

BOT 475. Comparative Genomics (4)

Statistics

ST 352. Introduction to Statistical Methods (4)

Organismal Biology Elective:

Choose at least 3 credits of upper division coursework related to the group of organisms that your research concerns. Examples could include:

BOT 321. Plant Systematics (4)

MB 302. General Microbiology (3)

PGB/CSS/HORT 430. Plant Genetics (3)

PGB/CSS/HORT 450. Plant Breeding (4)

Z 361. Invertebrate Biology (3)

Specialization and Breadth Courses:

Choose courses from the lists below, or other upper-division courses approved by research mentor, for a total of 29 option credits.

General electives:

BB 481. Biophysics (3)

BB 494. Biochemistry Laboratory (3)

BB 499. Special Topics: Biocomputing: Molecular Simulation (3)

MB 310. Bacterial Molecular Genetics (3)

MB 311. ^Molecular Microbiology Laboratory: A Writing Intensive Course (3)

MB 668. Microbial Bioinformatics and Genome Evolution (4)

If your interest is in biological data mining, suggested choices include:

CS 261. Data Structures (4)

CS 325. Analysis of Algorithms (4)

CS 420. Graph Theory with Applications to Computer Science (3)

If your interest is in modeling, suggested choices include:

MTH 254. Vector Calculus I (4)

MTH 256. Applied Differential Equations (4)

MTH 341. Linear Algebra I (3)

ST 411, ST 412. Methods of Data Analysis (4,4)

ST 421, ST 422. Introduction to Mathematical Statistics (4,4)

ST 441. Probability, Computing, and Simulation in Statistics (4)

Total = 29

PEST BIOLOGY AND MANAGEMENT OPTION

Pest biology and management involves the study of living organisms, such as insects, fungal and bacterial pathogens, vertebrates, and weeds, that limit agricultural productivity. Students with an interest in entomology may study identification, biology and control of insects, including integrated plant protection, biocontrol, and use of beneficial insects. Research approaches range from basic laboratory studies to field experiments. Students will develop research skills in pest biology, development of management strategies, and assessment of pest impact on plants or livestock, preparing them for a variety of regulatory and research positions and graduate programs.

Required Courses

BOT 331. Plant Physiology (4)

BOT 350. Introductory Plant Pathology (4)

CSS 311. Introduction to Insect Pest Management (5)*[Only offered at Eastern Oregon University]*

CROP 440. Weed Management (4)

or CSS 440. Weed Management (4)*[Only offered at Eastern Oregon University]*

Specialization and Breadth Courses

12 credits approved by option faculty and research mentor.

Total=29

PLANT GROWTH AND DEVELOPMENT OPTION

Plant growth and development involves study of the control and coordination of processes in cells, organs, and/or whole plants, including, for example, changes in gene expression in response to environmental conditions such as climate change. Students will develop research skills and knowledge about the regulation of plant growth and development, metabolism, structure and function of macromolecules (i.e. enzymes, storage proteins, and nucleic acids), and whole plant physiology, preparing them for agricultural and biosciences positions or graduate programs.

Required Courses

BOT 313. Plant Structure (4)

BOT 331. Plant Physiology (4)

Select two of the following:

BI 314. Cell and Molecular Biology (4)

BOT 332. Laboratory Techniques in Plant Biology (3)

BOT 421. Advanced Plant Systematics (4)

CSS 305. Principles of Soil Science (4)

and CSS 306. Problem Solving: Soil Science (1) [CSS taught at EOU LaGrande campus only.]

or SOIL 205. *Soil Science (4)

HORT 316. Plant Nutrition (4)

Specialization and Breadth Courses

12 to 14 credits approved by option faculty and research mentor.

Total=29

SUSTAINABLE ECOSYSTEMS OPTION

Sustainable ecosystems research addresses the sustainability of agricultural, forest, rangeland, wildlife, fishery, and native ecosystems. The program aims to define and develop natural and managed ecosystems in which environmental soundness results from the conscious interaction of humans with wildlife and other components of the systems. Innovative links among scientific and humanistic disciplines will bring about increased understanding of the present and future health of natural and managed ecosystems and associated human communities. Sustainable ecosystems research is multidisciplinary: insights from sociology, political science, anthropology, or philosophy may be combined with basic concepts from biology, chemistry, and physics to support research rooted in agricultural, forestry, rangeland management, or wildlife management. Students will acquire perspective by choosing among a broad variety of courses, and will participate in field, laboratory, or systems analysis projects, preparing them for graduate/professional schools or research and regulatory positions.

Required Courses**Ecology and Ecological Methods:**

BI 370. Ecology (3)

or BOT 341. Plant Ecology (4)

or FES 341. Forest Ecology (3)

or RNG 421. Wildland Restoration and Ecology (4)

BI 371. ^Ecological Methods (3)

or RNG 441 Rangeland Analysis (4)

Ethics/Values:**Select one of the following:**

PHL 440. Environmental Ethics (4)

PHL 443. *World Views and Environmental Values (3)

Social/Political:**Select one of the following:**

ANTH 481. *Natural Resources and Community Values (3)

ANTH 482. *Anthropology of International Development (4)

ANS 315. *Contentious Social Issues in Animal Agriculture (3)

AREC 352. *Environmental Economics and Policy (3)

FOR 460. ^Forest Policy (4)

FW 325. *Global Crises in Resource Ecology (3)

FW 340. *Multicultural Perspectives in Natural Resources (3)

HST 481. *Environmental History of the U.S. (4)

PS 475. Environmental Politics and Policy (4)

SOC 480. *Environmental Sociology (4)

SOC 481. *Society and Natural Resources (4)

Integrative/Management/**Conservation:****Select one of the following:**

ANS/SOC 485. *Consensus and Natural Resource Issues (3)

AREC 351. *Natural Resource Economics and Policy (3)

BA 463. Family Business Management (4)

BOT 488. Environmental Physiology of Plants (3)

CSS/SOIL 395. *World Soil Resources (3)

CSS/CROP 480. Case Studies in Cropping Systems Management (4)

FE 430. Watershed Processes (4)

FES 365. *Issues in Natural Resources Conservation (3)

FES 451. History and Cultural Aspects of Recreation (4)

FOR 457. Techniques for Forest Resource Analysis (4)

FOR 459. Forest Resource Planning and Decision Making (4)

FW 321. Fisheries and Wildlife Resource Ecology (3)

GEO 300. *Sustainability for the Common Good (3)

RNG 468. International Rangeland Resource Management (3)

RNG 477. *Agroforestry (3)

Z 348. *Human Ecology (3)

Specialization Courses

Nine to 14 credits approved by option faculty and research mentor.

Total=29

TOXICOLOGY OPTION

Toxicology concerns potentially hazardous chemicals in food and the environment, and their effects on biological life. Toxic chemicals include pesticides such

as insecticides and herbicides, industrial waste products, compounds that exist naturally in plants, those that contaminate foods as a result of fungal growth, and even some that are produced in the preparation and cooking of foods. Potential health effects from toxin exposures can range from immediate impairment of breathing or nerve function to chronic diseases, cancer, birth defects, and immune disorders. Toxicology research focuses on understanding mechanisms of toxicity, human and environmental risks from exposure, and means for reducing risks. Students will acquire laboratory skills in applied biochemistry and molecular, cellular, and organismal biology, preparing them for research or regulatory positions or biosciences/biomedical graduate/professional programs.

Substituted Courses

CH 334, CH 335, CH 336. Organic Chemistry (3,3,3) for CH 331, 332 (4,4).

Required Courses

TOX 411. Fundamentals of Toxicology (3)

TOX 413. Environmental Toxicology and Risk Management (3)

Specialization and Breadth Courses

23 credits approved by option faculty and research mentor.

Total=29

WATER RESOURCES OPTION

Water resources research involves the use of science and policy tools to identify contaminants and make assessments of water quality. Students will acquire laboratory skills to detect water contaminants and track their movements and transformations, while learning related policy and management concerns. Research areas could include microbial contaminants, the impact of urbanization on water quality, and marine and estuarine water quality and its impact on fisheries and shellfish industries. Option course work covers water sciences and hydrology, environmental policy and management. Students completing this option will be prepared for graduate school or for positions in environmental consulting, research, and natural resource management.

Water Sciences:**Choose four courses from below:**

CSS 305. Principles of Soil Science (4)

[Taught at EOU LaGrande campus only.]

or SOIL 205. *Soil Science (4)

FW 456. Limnology (5)

GEO 487. Hydrogeology (4)

MB 302. General Microbiology (3)

OC 332. Coastal Oceanography (3)

OC 433. Coastal and Estuarine Oceanography (3)

TOX 430. Chemical Behavior in the Environment (3)

Watersheds and Hydrology:**Choose one course from below:**

CE 412. Hydrology (4)

FE 430. Watershed Processes (4)

Water Resources Environmental

Analysis:

Choose one course from below:

BEE 448. Non-point Source Pollution Assessment and Control (3)
 BI 371. ^Ecological Methods (3)
 BOT 547. Nutrient Cycling (3)
 CE 413. GIS in Water Resources (3)
 ENVE 456. Sustainable Water Resources Development (3)
 GEO 424. International Water Resources Management (3)
 TOX 455. Ecotoxicology: Aquatic Ecosystems (3)

Water Resources Environmental Policy and Management:

Choose one course from below:

AREC 432. Environmental Law (4)
 FOR 462. Natural Resource Policy and Law (3)
 FW 326. Integrated Watershed Management (3)
 GEO 425. Water Resources Management in the US (3)
 MRM 515. Coastal Resources Management (4)
 PS 475. Environmental Politics and Policy (4)
 RNG 455. Riparian Ecology and Management (3)

Specialization and Breadth Courses:

1 to 7 additional credits of upper division courses approved by research mentor, for a total of 29 credits.

Recommended areas: Climatology, geology, resource economics, watersheds, watersheds management, microbial ecology, engineering, mathematics, hydrology, hydrogeology, irrigation, toxicology, ecology, environmental analysis, environmental chemistry, geochemistry, environmental management, environmental policy, economics, marine biology, aquatic and marine botany and zoology, oceanography, statistics, geography, environmental ethics, research ethics.

INTERNATIONAL STUDIES (BA, HBA)

See International Programs for information on the International Studies Degree.

SUSTAINABILITY (BS, HBS)

The Sustainability Double Degree includes core, practicum and individualized study components. Courses from a student's major course of study will not count towards double-degree requirements. Completion of the double degree will require 36 credits beyond the 180-credit minimum for graduation.

OSU Main Campus Contact: Kate Lajtha, 3059 Ag Life Sciences Building, Oregon State University, Corvallis, OR 97331; 541-737-5674; kate.lajtha@oregonstate.edu or Fox Peterson, Lead Advisor, fox.peterson@oregonstate.edu.

OSU-Cascades Campus Contact: Matt Shinderman, Forest Ecosystems and Society, Oregon State University Cas-

cades; 541-322-3159; matt.shinderman@osucascades.edu.

Sustainability Core (17)

NR 350. *Sustainable Communities (4)
 SUS 304. *Sustainability Assessment (4)
 SUS 420. Social Dimensions of Sustainability (3)
 SUS 430. Ecological Dimensions of Sustainability (3) **[Pending approval]** or BI 301. *Human Impacts on Ecosystems (3) or BI 306H. *^Environmental Ecology (3)
 SUS 440. Economic Dimensions of Sustainability (3) **[Pending approval]** or AREC 352/ECON 352. *Environmental Economics and Policy (3) or AREC 434. ^Measuring Resource and Environmental Impacts (4)

Practicum (3)

SUS 410. Sustainability Internship (3) or SUS 499. Sustainable Workshop/Service Learning (3)

Note: SUS 410. Credits may be achieved by participation in an IE3 Global Internship with advisor approval.

Remaining Credits (16)

In addition to the 20 credits specified above, students must work with the sustainability program advisor to select courses relevant to their discipline and career path interests (16 credits total).

Credit total=36

Classes that can be used to fulfill remaining requirements are listed below. Students are NOT limited to taking courses within their primary major of study. The sustainability advisor(s) will approve courses not listed here if they have an obvious link to sustainability and fulfill the intent of the double degree. See the OSU Sustainability Office list of sustainability-related courses.

Business

AREC 250. *Introduction to Environmental Economics and Policy (3)
 AREC 351. *Natural Resource Economics and Policy (3)
 AREC 352. *Environmental Economics and Policy (3)
 AREC 434. ^Measuring Resource and Environmental Impacts (4)
 BA 302. Business Process Management (4)
 BA 351. Managing Organizations (4)
 BA 352. Managing Individual and Team Performance (4)
 BA 362. Social Entrepreneurship and Social Initiatives (4)
 BA 465. *Systems Thinking and Practice (4)
 BA 466. Integrative Strategic Experience (4)
 ECON 202. *Macroeconomics (4)
 ECON 311. Intermediate Microeconomic Theory (4)
 MGMT 452. Leadership (4)

Engineering

BEE 221. Fundamentals of Ecological Engineering (3)
 BEE 320. Biosystem Analysis and Modeling (3)
 BEE 322. Ecological Engineering Thermodynamics and Transfer Process (4)
 CCE 422. Green Building Materials (3)

CHE 450. Conventional and Alternative Energy Systems (3)

CHE 451. Solar Energy Technologies (3)
 ECE 430. Contemporary Energy Applications (4) **[Pending approval]**
 ECE 438. Electric and Hybrid Vehicles (4)
 ENGR 350. *Sustainable Engineering (3)
 ENVE 321. Environmental Engineering Fundamentals (4)
 ME 312. Thermodynamics (4)

Natural Sciences

ATS 320. *The Changing Climate (3)
 BI 301. *Human Impacts on Ecosystems (3)
 BI 306. *^Environmental Ecology (3)
 BI 349/Z 349. *Biodiversity: Causes, Consequences and Conservation (3)
 BI 370. Ecology (3)
 BI/FES/TOX 435. *Genes and Chemicals in Agriculture: Value and Risk (3)
 CH 374. *Technology, Energy, and Risk (3)
 CH 390. Environmental Chemistry (3)
 FES 341. Forest Ecology (3)
 FES 355. Management for Multiple Resource Values (3)
 FES 360. Collaboration and Conflict Management (3)
 FES 365. *Issues in Natural Resources Conservation (3) *Ecampus only*
 FES/FW 445. Ecological Restoration (4)
 FES 455. Urban Forest Planning, Policy and Management (4) *Ecampus only*
 FOR 462. Natural Resource Policy and Law (3)
 FW 251. Principles of Fish and Wildlife Conservation (3)
 FW 303. Survey of Geography Information Systems in Natural Resources (3)
 FW 321. Applied Community and Ecosystem Ecology (3)
 FW 325. *Global Crises in Resource Ecology (3)
 FW 326. Integrated Watershed Management (3)
 FW 340. *Multicultural Perspectives in Natural Resources (3)
 FW 350. *Endangered Species, Society, and Sustainability (3)
 FW 435. ^Wildlife an Agricultural Ecosystems (3)
 FW 485. *Consensus and Natural Resources (3)
 FW 488. Problem Solving in Fisheries and Wildlife Science (3)
 FW 489. Effective Communications in Fisheries and Wildlife Science (3)
 GEO 300. *Sustainability for the Common Good (3)
 GEO 306. *Minerals, Energy, Water, and the Environment (3)
 GEO 309. *Environmental Justice (3)
 GEO 324. Geography of Life: Species Distributions and Conservation (4)
 GEO 330. *^Geography of International Development and Globalization (3)
 GEO 350. *Population Geography (3)
 GEO 365. Introduction to Geographic Information Systems (4)
 GEO 420. Geography of Resource Use (3)
 GEO 423. Land Use in the American West (3)
 GEO 424. International Water Resources Management (3)
 GEO 426. Third-World Resource Development (3)
 GEO 451. Environmental Site Planning (3)

- GEO 452. Principles and Practices of Rural and Resource Planning (3)
 GEO 453. Resource Evaluation Methods/EIS (3)
 PH 313. *Energy Alternatives (3)
 SOIL/GEO 335. *Introduction to Water Science and Policy (3)
 SOIL 475. Soil Resource Potentials (3)
 SOIL 499. ST/Gen Modified Organisms and Sustainable Agriculture (1-16)
 SOIL 499. ST/Organic Farming (1-16) or HORT 260. Organic Farming and Gardening (3)
 Z 348. *Human Ecology (3)
 Z 349/BI 349. *Biodiversity: Causes, Consequences, and Conservation (3)

Social Sciences/Humanities

- ANTH 481. *Natural Resources and Community Values (3)
 AREC 250. *Introduction to Environmental Economics and Policy (3)
 AREC 253. *Environmental Law, Policy, and Economics (4)
 AREC 351. *Natural Resource Economics and Policy (3)
 AREC 352. *Environmental Economics and Policy (3)
 AREC 434. ^Measuring Resource and Environmental Impacts (4)
 COMM 408. Workshop (3)
 COMM 440. Theories of Conflict and Conflict Management (3)
 COMM 442. Bargaining and Negotiation Processes (3)
 ENG 482. Studies in American Literature, Culture and the Environment (4)
 PHL 325. *Scientific Reasoning (4)
 PHL 390. Moral Theories (3)
 PHL 439. Philosophy of Nature (3)
 PHL 440. Environmental Ethics (3)
 PHL 443. *World Views and Environmental Values (3)
 PS 331. State and Local Government and Politics (4)
 PS 370. *Science, Religion, and Politics (4)
 PS 449. ^Topics in Comparative Politics (4)
 PS 461. Environmental Political Theory (4)
 PS 475. Environmental Politics and Policy (4)
 PS 477. International Environmental Politics and Policy (4)
 SOC 360. *Population Trends and Policy (4)
 SOC 480. *Environmental Sociology (4)
 SOC 481. *Society and Natural Resources (4)
 SOC 485. *Consensus and Natural Resources (3)

Footnotes:

- * Bacc Core Course
 ^ Writing Intensive Course (WIC)

BIOENERGY MINOR

Bioenergy is renewable energy derived from biomass, including by-products, residues, waste products, and crops and microbes grown specifically for fuel. Development of bioenergy could contribute to long-term environmental and economic sustainability, and help mitigate the climate impact of using fossil fuels. However, developing and establishing bioenergy will require integrating expertise from social, economic, and scientific/technical fields.

The Bioenergy minor is research-based and interdisciplinary, and provides an introduction to bioenergy concepts and issues, along with research experience and professional development. The Bioenergy minor is open to students in majors in science, agricultural sciences, forestry, engineering, earth/ocean/atmospheric sciences, education, social sciences and business, or with permission of the bioenergy adviser. Required classes for the minor present central bioenergy concepts such as life cycle analysis, feedstocks, feedstock conversions, and sustainability; introduce interdisciplinary research and research methods; expose students to regional bioenergy industries and issues; and provide professional skills and training. Each student will do a mentored bioenergy research project with a participating faculty member, industry or extension partner; write a thesis; and present a public seminar. This transcript-visible minor complements existing majors to help students attain their career or graduate/professional school goals in the growing field of bioenergy.

For further information, contact:

Kate Field, Director

Wanda Crannell, Advisor

137 Strand Agriculture Hall

Oregon State University

Corvallis, OR 97331-2911

541-737-2999

E-mail: BRR@oregonstate.edu

Website: <http://agsci.oregonstate.edu/brr/>

A basic knowledge of chemistry is needed to understand bioenergy core concepts, such as the carbon cycle and pathways of energy conversion. Bioenergy minor students must take CH 122 or equivalent. CH 122 fulfills Bacc Core requirements and is a prerequisite for WSE 473, which is required for the Bioenergy minor.

Required

- BRR 350. Introduction to Regional Bioenergy (2)
 BRR 450. Interdisciplinary Research: Bioenergy Focus (2)
 BRR 401. Research and Scholarship (10)
 BRR 403. Thesis (3)
 BRR 406. Projects: Data Presentation (1)
 BRR 407. Seminar (1)
 WSE 473. Bioenergy and Environmental Impact (3)

Bioenergy Electives Categories

Technical Electives:

Choose one course from this list, or another course approved by the Bioenergy advisor that fulfills the intent of the Technical category.

- BB 350. Elementary Biochemistry (4)
 BEE 320. Biosystems Analysis and Modeling (4)
 BEE 472. Introduction to Process Engineering (4)
 BEE 473. Introduction to Process Engineering Design (4)

- BEE 480. Bioproduct Engineering (3)
 BEE 499/599. Special Topics: Biofuel Feedstocks and Production (3)
 BI 314. Cell and Molecular Biology (4)
 BIOE 457. Bioreactors I (3)
 BIOE 490. ^Bioengineering Process Design (4)
 BOT 321. Plant Systemics (4)
 BOT 331. Plant Physiology (4)
 BOT 414. Agrostology (4)
 BOT 475. Comparative Genomics (4)
 CROP 300. Crop Production in Pacific Northwest Agroecosystems (4)
 FST 479. Fermentation Microbiology (3)
 HORT 301. The Biology of Horticulture (3)
 HORT/PBG 430. Plant Genetics (3)
 MB 230. *Introductory Microbiology (4)
 MB 302. General Microbiology (3)
 MB 303. General Microbiology Laboratory (2)
 MB 312. Bacterial Physiology and Metabolism (3)
 PH 313. *Energy Alternatives (3)
 WSE 210. *Renewable Materials Technology and Utilization (4)
 WSE 321. Chemistry and Structure of Renewable Materials (4)
 WSE 322. Physical and Mechanical Properties of Renewable Materials (4)
 WSE 324. Renewable Materials Laboratory (3)

Environmental:

Choose one course from this list, or another course approved by the Bioenergy advisor that fulfills the intent of the Environmental category.

- ATS 320. *The Changing Climate (3)
 BEE 499. Special Topics: Bioenergy Systems and Life-Cycle Analysis (2)
 BI 301. *Human Impacts on Ecosystems (3)
 BI 306. *^Environmental Ecology (3)
 CH 390. Environmental Chemistry (3)
 ENGR 350. *Sustainable Engineering (3)
 ENSC 479. *^Environmental Case Studies (3)
 ENVE 321. Environmental Engineering Fundamentals (4)
 ENVE 322. Fundamentals of Environmental Engineering (4)
 ENVE 415. Environmental Engineering Laboratory (3)
 ENVE 425. Air Pollution Control (3)
 IE 491. Selected Topics in Systems Studies: 'Sustainable Engineering Analysis' (3)
 WSE 473. Bioenergy and Environmental Impact (3)

Social/Economic/Policy:

Choose one course from this list, or another course approved by the Bioenergy advisor that fulfills the intent of the Social/Economic/Policy category.

- AG 492. Technology Transfer in Agriculture (3)
 AREC 250. *Introduction to Environmental Economics and Policy (3)
 AREC 351. *Natural Resource Economics and Policy (3)
 AREC 352. *Environmental Economics and Policy (3)
 AREC 434. ^Measuring Resource and Environmental Impacts (4)
 AREC 454. Rural Development Economics and Policy (3)

BA 362. Social Entrepreneurship and Social Initiatives (4)
 BA 363. Technology and Innovation Management (4)
 BA 458. Innovation and New Product Development (4)
 BA 464. New Venture Financing (4)
 CH 374. *Technology, Energy, and Risk (3)
 FOR 330. Forest Conservation Economics (4)
 FS 432. Planning Agroforestry Projects (2)
 FS 477. *Agroforestry (3)
 FS 485. *Consensus and Natural Resources (3)
 FS 492. Ecosystem Services Ecology, Sociology, Policy (3)
 FW 325. *Global Crises in Resource Ecology (3)
 GEO 335. *Introduction to Water Science and Policy (3)
 GEO 452. Principles and Practices of Rural and Resource Planning (3)
 SED 459. Science and the Nature of Inquiry (3)
 SOC 418. Qualitative Research Methods (4)
 SOC 481. *Society and Natural Resources (4)
 TCE 253. Learning Across the Lifespan (3)
 WSE 455. Marketing and Innovation in Renewable Materials (4)

Total=28–34

COURSES

BRR 100. GREAT EXPERIMENTS IN BIORESOURCE SCIENCES (1). For students interested in BRR and undergraduate research, to introduce the research process and help them start defining research interests and project areas. Faculty describe research projects and experimental approaches, and pose interesting political and ethical questions related to scientific research. Students work with junior and senior student mentors already involved in research projects. Offered fall term. This course is repeatable for a maximum of 2 credits.

BRR 200. DEVELOPING A RESEARCH PROPOSAL: THEORY AND PRACTICE (1). An introduction to conceptual issues for organizing, planning, designing and conducting research in biological and agricultural sciences and natural resources disciplines. Students will master methods and philosophy of research, and then apply them by working in teams to analyze a timely and relevant problem and formulate experimental approaches to address it. This course is repeatable for a maximum of 2 credits.

BRR 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

BRR 350. INTRODUCTION TO REGIONAL BIOENERGY (2). Field trips to visit regional industry and research facilities will introduce bioenergy core concepts and technologies. Guest lecturers will provide technical background and discuss economic, environmental and socio-cultural sustainability of bioenergy. Course projects will analyze and present each facility in the context of regional bioenergy issues. Lec/lab.

BRR 401. RESEARCH AND SCHOLARSHIP (1-16). Undergraduate mentored research. Students select a faculty research mentor (from 7 OSU colleges) and complete 14 credits of research. Students follow established guidelines to prepare project proposals, progress reports, and a thesis; learn research methods applicable to their chosen field; gain professional skills and contacts.

Students are evaluated on their ability to develop and complete a research project proposal, learn and develop research methodologies, conduct research and trouble-shooting procedures, and demonstrate responsible and ethical participation in the research project. Offered all terms. This course is repeatable for a maximum of 99 credits. **PREREQS:** Departmental approval required.

BRR 403. ^THESIS (4). BRR students independently interpret and present their research in writing. Students write the thesis in a style appropriate for submission to a peer-reviewed journal in their chosen scientific discipline. Students receive a letter grade based on their final thesis. Timeliness of reports is factored in student assessments. The student's faculty mentor and the BRR Director provide a consensus grade when the thesis is completed. Offered all terms. (Writing Intensive Course) This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

BRR 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

BRR 406. PROJECTS: DATA PRESENTATIONS (1). For any student doing research, to learn to develop and evaluate poster and slide presentations containing scientific data. Students are exposed to a variety of scientific disciplines as they prepare and critique their own and other students' posters and oral presentations. Students improve written and oral communication skills. Letter grade is based on participation, improvement, and the quality of a final poster project and oral presentation. Offered winter term. CROSSLISTED as HORT 406.

BRR 407. SEMINAR (1). For BRR students, to encourage excellence in public speaking. Exposes students to a variety of current seminar topics and provides them with the opportunity to evaluate components of good public seminars. Students receive a grade only after completing a public seminar on their own research (final research seminar). Offered spring term.

BRR 409. PRACTICUM: TEACHING AND PEER MENTORING (1-2). Upper-division BRR students are grouped with lower-division students in BRR 100 to facilitate discussion and encourage dialogue about current research topics. Juniors and seniors continue to learn new ways to teach and communicate science issues in written and verbal formats. Offered fall term. This course is repeatable for a maximum of 16 credits.

BRR 410. INTERNSHIP (1-12). Supervised internship allowing students to gain off-campus work experience for credit. Under direction and approval of the program director, students will submit a statement of intent, identify employer contact, and provide a written report upon completion. This course is repeatable for a maximum of 16 credits. **PREREQS:** Junior standing.

BRR 450. INTERDISCIPLINARY RESEARCH: BIOENERGY FOCUS (2). Bioenergy research presentations and papers introduce scientific inquiry, the research process, research seminars, papers and proposals. Analysis of different disciplines' approaches to research tools and data sources (e.g., quantitative versus qualitative approaches). Student teams write research proposals. Second core class in the Bioenergy minor.

BRR 499. SPECIAL TOPICS (2). This course is repeatable for a maximum of 4 credits.

AGRICULTURAL EDUCATION AND GENERAL AGRICULTURE

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FACULTY

Professors Cole (Emeritus), Thompson
Assistant Professor Lambert, Velez
Instructors Elliott, Jansen, Jones,
Mathewson, Sorenson, Strawn, Woodside

Undergraduate Major

Agricultural Sciences (BS, CRED, HBS)

Minors

Agricultural Sciences
International Agricultural Development
Leadership

Graduate Majors

Agricultural Education (MAg, MAIS, MS)

Graduate Areas of Concentration
*Teacher Preparation, Leadership, and
Communication in Agriculture*

Master of Agriculture (MAg)

Graduate Areas of Concentration
*Three agriculturally related areas
are required. Areas may be applied
economics, agricultural education, animal
science, botany and plant pathology,
crop science, entomology, fisheries
science, food science and technology,
horticulture, rangeland ecology and
management, soil science, toxicology,
wildlife science, or other areas approved
by the College of Agricultural Sciences.*

Graduate Minors

Agricultural Education
International Agricultural Development

The Department of Agricultural Education and General Agriculture combines two programs: **Agricultural Sciences** and **Agricultural Education**.

The **Agricultural Sciences Program** is an undergraduate studies program that provides maximum flexibility in designing and structuring a course of study to meet the students' individual needs. Agricultural Sciences should be seriously considered by students desiring programs of study not currently available in any other agricultural subject matter department (such as those involving a minor in communications, recreation, or environmental studies in agriculture); students wishing to pursue two or more areas of specialization (such as students who are returning to farms or ranches

and who need substantial background, for example, in animal science, crops, and agricultural business management); students preparing for leadership positions in agriculture that require excellent communication and leadership skills as well as breadth of agricultural background (such as agriculture teachers, lobbyists, commodity liaison persons or extension staff); or students who have not selected a departmental major in the College of Agricultural Sciences but who know they are interested in an agricultural career.

The goal of the Agricultural Sciences Program is to help students identify the agricultural career in which they are most interested and build a course of study that will qualify each student for his or her chosen profession. Advising is of paramount importance in this process and major emphasis is placed on career advising.

The **Agricultural Education Program** offers course work serving teachers and leaders in agriculture. The MS, MAg, and MAIS degrees may be pursued with an emphasis in leadership, communication, pedagogy, extension and/or technical agriculture. Candidates work with an advisor to develop programs that meet their specific needs as indicated by their occupational objectives. The Agricultural Education MS degree aligns with an initial teaching license in Oregon.

Three undergraduate minors are available in the Department of Agricultural Education and General Agriculture.

- a. The **Agricultural Sciences minor** is available for undergraduate students who have majored in an area that requires the addition of breadth in agriculture to their major program. The minor provides the appropriate technical agriculture background for students interested in agricultural management, communication, environmental studies, etc.
- b. The **International Agricultural Development minor** is available for both undergraduate and graduate students who are interested in agricultural development abroad. The minor requires foreign language proficiency, as well as appropriate agricultural and sociological course work.
- c. The **Leadership minor** is designed for all undergraduates interested in developing premier leadership, enhancing professional competencies, and fostering the skills necessary to meet the local, national, and international needs of our society. The Leadership minor is centered on leadership theory (education), trait/skill development

(training), and application (development), and it is designed to allow students to both take and apply coursework in a relevant and relational manner.

CAREER OPPORTUNITIES IN AGRICULTURAL SCIENCES

Career opportunities for general agriculture majors are unlimited because of the nature of the program structure. Students can return to home farms or ranches, move into agricultural middle management, become extension staff, move into political lobby positions, work in marketing or international agriculture, become high school teachers of agriculture, teach agriculture in community colleges, or do whatever they have planned to accomplish from their program of study. Salaries vary depending on the position a student may strive to achieve.

UNDERGRADUATE STUDIES CURRICULUM

High school and college transfer students who are admitted to Oregon State University as an undergraduate are eligible to participate in the Agricultural Sciences Program. Agricultural Sciences majors, in consultation with their departmental academic advisor, may plan elective course work to emphasize personal interests, abilities and career objectives. A leadership and communication area of emphasis is available and is especially designed for those students who will need breadth in their technical agriculture background and excellence in communication and leadership skills. The intent of this area of emphasis within the Agricultural Sciences Program is to prepare agriculture's future leaders in extension, government, and business. A teacher preparation area of emphasis is available and allows for Initial Teacher Licensure within the baccalaureate degree.

AGRICULTURAL SCIENCES (BS, CRED, HBS)

BS Baccalaureate Core (48)

Agricultural Core

AG 111. Computer Applications in Agriculture (3)

AG 421. ^Leadership Development (3)

AREC 211. Management in Agriculture (4)

SOIL 205. *Soil Science (4)

or CSS 305. Principles of Soil Science (4)
[*Taught at EOU LaGrande campus only.*]

Agricultural electives (60 credits required, may include above, 24 of which must be upper division)

Business

BA 215. Fundamentals of Accounting (4)

BA 230. Business Law I (4)

or AREC 253. *Environmental Law, Policy, and Economics (4)

or AREC 388. Agricultural Law (4)

Communication

Communications/Speech Elective (3)

Humanities, Arts and Social Sciences

ECON 201. *Introduction to Microeconomics (4)
or AREC 250. *Introduction to Environmental Economics and Policy (3)

Sciences—Physical and Biological

Physical science—chemistry (10–15)
CH 121. General Chemistry (5)
CH 122. *General Chemistry (5)
Biological sciences—one-year series (12)
BI 101. *General Biology (4)
BI 102. *General Biology (4)
BI 103. *General Biology (4)

Math

MTH 105. *Introduction to Contemporary Mathematics (3)

Electives (48–52)

Total=180

UNDERGRADUATE MINORS**AGRICULTURAL SCIENCES MINOR****Lower-Division Core**

AG 111. Computer Applications in Agriculture (3)
One agricultural resource management (AREC, CSS, FW, HORT, RNG) course (3–4)
One production agriculture (AG, ANS, AREC, CSS, CROP, FST, HORT, SOIL) course (3–4)

Upper-Division Core

Two courses from a department in the College of Agricultural Sciences (6–8)
Two courses from a second department in the College of Agricultural Sciences (6–8)

Electives (0–9)

From departments in the College of Agricultural Sciences.

Total=27

INTERNATIONAL AGRICULTURAL DEVELOPMENT MINOR**Requirements**

AG 421. ^Leadership Development (3)
Language competency
Technical electives in agriculture (9)
Social, cultural and economic electives (5)
Minimum of 27 credits of which 12 credits must be upper division.

LEADERSHIP MINOR

The Leadership minor is designed for all undergraduates interested in developing premier leadership, enhancing professional competencies, and fostering the skills necessary to meet the local, national, and international needs of our society. The Leadership minor is centered on leadership theory (education), trait/skill development (training), and application (development), and it is designed to allow students to both take and apply course work in a relevant and relational manner.

Specifically, the course work focuses on major theories of leadership including contingency, path-goal, leader-member exchange theories as well as transformational, authentic, team, and servant leadership. Within each theory and type of leadership, students will be challenged to consider leadership ethics, leadership culture, gender in leadership, and integration of leadership into personal, civic, and social change. In addition, the elective courses allow students to pursue the development of trait and skill competencies necessary for employment in their chosen field. Students will then have the opportunity to directly apply their learning through a leadership internship, service learning project, or research opportunity.

Leadership Theory (8 credits)

AG 242. Personal Leadership Development (3)
AG 342. Team and Organizational Leadership (3)
AG 407. Seminar: Leadership Capstone (2)

Trait/Skill Development (10 credits)
Select 10 credits: no more than 2 courses from any single department:

AG 421/AG 521. ^Leadership Development (3)
AHE 499. Special Topics: Emerging Leaders (2)
ALS 295. Last Year Experience (2)
AS 311. Leadership Fundamentals, Team Building and Problem Solving (3)
COMM 218. *Interpersonal Communication (3)
COMM 316. Advanced Persuasion (3)
COMM 322. Small-Group Problem Solving (3)
EXSS 299. Special Topics: Introduction to Adventure Programming (3)
EXSS 299. Special Topics: Backcountry Leadership (3)
EXSS 299. Special Topics: Group Dynamics (3)
IE 470. Management Systems Engineering (4)
MS 211. Military Science II: Foundations of Leadership I (2)
NS 211. Leadership and Management (3)
PAC 299. Special Topics: Challenge Course Facilitation (3)
PHL 205. *Ethics (4)
PHL 207. *Political Philosophy (4)
PHL 280. *Ethics of Diversity (4)
PHL 443. *World Views and Environmental Values (3)
PSY 370. Personality (4)
PSY 437. Motivation (4)
YDE 484. Leadership and Management (2)

Applied Leadership Development (10 credits)

Select 10 credits total, may include a mix of the following courses:

AG 410. Internship (1–10)
AG 409. Practicum: Service Learning (1–10)
AG 401. Research: Undergraduate Research/Leadership (1–10)

Total=28

GRADUATE MAJORS**AGRICULTURAL EDUCATION (MAg, MS, MAIS)**

Graduate Areas of Concentration
Teacher preparation, leadership and communication in agriculture

The Department of Agricultural Education and General Agriculture offers course work that serves teachers and leaders in agriculture. The Master of Science, Master of Agriculture, and Master of Arts in Interdisciplinary Studies degrees may be pursued with an emphasis in leadership, communication, pedagogy, extension, and/or technical agriculture. Candidates work with an advisor to develop programs that meet their specific needs as indicated by their occupational objectives. A person who completes an Agricultural Education master's degree is not solely locked into teaching. Potential occupations also include lobbyist, journalist, and Extension work.

MASTER OF AGRICULTURE (MAg)

Graduate Areas of Concentration

Three agriculturally related areas are required. Areas may be applied economics, agricultural education, animal science, botany and plant pathology, crop science, entomology, fisheries science, food science and technology, horticulture, rangeland ecology and management, soil science, toxicology, wildlife science, or other areas approved by the College of Agricultural Sciences.

The Department of Agricultural Education and General Agriculture offers course work that serves teachers and leaders in agriculture. The Master of Science (MS), Master of Agriculture (MAg), and Master of Arts in Interdisciplinary Studies (MAIS) degrees may be pursued with an emphasis in leadership, communication, pedagogy, extension, and/or technical agriculture. Candidates work with an advisor to develop programs that meet their specific needs as indicated by their occupational objectives.

A minimum of 45 credits is required for the degree with a minimum of 24 credits outside of the major. The program of study will include a major field and two minor fields. The major field must be in the College of Agricultural Sciences and contain a minimum of 12 credits (excluding research or thesis credit.) Students have the option of a research paper (3–6 credits) or thesis (6 credits). Each minor concentration must contain a minimum of 9 credits. No more than 9 blanket numbered credits are to be contained in the program, excluding research paper or thesis.

The program is administered by the academic department of the major field and requires the department head's signature. The student's committee will consist of a representative from the

major and each minor field. A Graduate Council representative will serve on thesis programs. The committee will meet prior to the end of the student's second quarter in the program to approve the student's program of study proposal. The proposal will include the student's academic/professional background, intended occupational/educational destination, and rationale for the course combinations. A final oral examination is required and may include questions from both the course work and the research paper or thesis.

GRADUATE MINORS

AGRICULTURAL EDUCATION GRADUATE MINOR

Develop a teaching, pedagogical, leadership development in agriculture minor by working with a departmental advisor.

INTERNATIONAL AGRICULTURAL DEVELOPMENT GRADUATE MINOR

Requirements

AG 521. Leadership Development (3)

Language competency

Technical electives in agriculture (5 for master's, 9 for doctorate)

Social, cultural and economic electives (5)

Minimum of 21 credits for master's, 25 for doctorate.

Note: The graduate minor in International Agricultural Development is not available to students who took the undergraduate minor in International Agricultural Development at Oregon State University.

AGRICULTURAL EDUCATION COURSES

AED 313. THEORY AND PRACTICUM III: FIELD (4). Field based experience for students preparing to be agricultural teachers. Focus on teaching models. **PREREQS:** Advising and placement by AED staff.

AED 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

AED 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

AED 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

AED 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

AED 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

AED 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

AED 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

AED 509. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

AED 510. PROFESSIONAL INTERNSHIP: AGRICULTURE EDUCATION (1-40). A field experience in which the intern will integrate academic study with classroom teaching experience to learn specific competencies relating to functioning well in the context of the classroom and the school, and demonstrate this competency through the assessment of work by supervisors

and by evidence collected and presented in work samples. This course is repeatable for a maximum of 40 credits.

AED 518. EXTENSION COURSE IN TEACHER EDUCATION/PEDAGOGY (1-3). Enables present and prospective teachers of agriculture to continue their professional development on pedagogical topics of current importance. (This course is limited to 9 credits per term.) This course is repeatable for a maximum of 50 credits.

AED 533. RURAL SURVEY METHODS (3). Technique; analyzing, interpreting, and using results of survey data; identifying and utilizing community resources; develop and organize agriculture programs to meet community needs.

AED 552. PROGRAM ORGANIZATION AND MANAGEMENT (3). Explores the foundations of vocational education, essential learning skills, advisory committees, and development of a vocational education philosophy. Students will study the elements of educational reform as they apply to specific service areas. Resource analysis, student organizations, and school-to-work transitions will also be studied.

AED 553. APPLIED INSTRUCTIONAL STRATEGIES (3). Helps students in the identification and development of goals, objectives and units. The course includes the development and application of subject area instructional strategies/models, including applied math, writing, communication skills, measurement and evaluation of achievement, and delivery of instruction to at-risk students. Safety is a primary focus.

AED 554. MICRO-TEACHING (3). Planning, presenting and evaluating lessons in a micro-teaching lab. It includes application of content pedagogy strategies, subject matter principles and media technology. Lessons presented on safety.

AED 556. LINK RESEARCH, TEACHING, AND PRACTICE (3). Links research to teaching. Students will work with cooperating teachers to identify and apply research to teaching.

AED 557. ISSUES AND TRENDS IN CURRICULUM AND INSTRUCTION (3). Emphasizes trends related to subject matter curriculum issues unique to agricultural education at the secondary level.

AED 558. IMPROVING VOCATIONAL EDUCATION PROGRAMS (3). Stresses evaluation of programs and students, standardization and accreditation, legislation and state criteria for improving programs. Students will review applied research, and apply criteria for improving service area program and occupational guidance.

AED 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

AGRICULTURE-GENERAL COURSES

AG 111. COMPUTER APPLICATIONS IN AGRICULTURE (3). Computer use in agriculture and agribusiness; practical experience with computer programs applicable to all agricultural disciplines.

AG 199. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 16 credits.

AG 211. SURVEY AND CONSTRUCTION (3). Land measurement and leveling as applied to agricultural uses. Concrete and agricultural building construction including the use of construction power tools, selection of materials and cost estimating.

AG 221. METALS AND WELDING (3). Practices of metal working including the use of metal working machines, metal identification, heat treating and metal properties. Fabrication of metals including arc and oxy-acetylene welding and cutting. Lec/lab.

AG 242. PERSONAL LEADERSHIP DEVELOPMENT (3). Examines content related to leadership traits, styles, and effective leadership tactics. An introductory course designed to create awareness and develop the employability skills necessary for participants to be productive contributors in their school, home, community and profession.

AG 301. *ECOSYSTEM SCIENCE OF PACIFIC NW INDIANS (3). Designed and presented in partnership with Pacific Northwest Indians and Alaska Natives, focusing on natural ecosystems, differing views, power relationships, policymaking, and gender roles. (Bacc Core Course)

AG 312. ENGINE THEORY AND OPERATION (3). Engine construction, operational theories and principles, lubrication, fuels and oils, emissions and preventive maintenance are taught through the process of small engine lab activities. Engine efficiency theories and measurement are presented.

AG 318. ACCESSING INFORMATION FOR AGRICULTURAL RESEARCH (1). Designed for students at a distance to develop library skills and improve access to information used to conduct technical agricultural research.

AG 342. TEAM AND ORGANIZATIONAL LEADERSHIP (3). Examines the planning, implementation and evaluation of organizations, and challenges students in the development of effective communication, group dynamics, conflict management, teambuilding and problem solving. Students will be challenged to examine their leadership role in their school, community and profession. **PREREQS:** AG 242

AG 391. FARM IMPLEMENTS (3). Power farming implements including operation, maintenance, adjustments, calibration and use are covered. Field trips may be required.

AG 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

AG 402. INDEPENDENT STUDIES (1-16). This course is repeatable for a maximum of 16 credits.

AG 403. THESIS (1-16). PREREQS: Departmental approval required.

AG 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

AG 406. SPECIAL PROBLEMS (1-16). This course is repeatable for a maximum of 16 credits.

AG 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

AG 409. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

AG 410. INTERNSHIP (1-16). A work internship to give students practical on-the-job preparation in any of the main facets of agriculture or related industries. This course is repeatable for a maximum of 16 credits. **PREREQS:** College and instructor approval.

AG 412. AG SAFETY AND HEALTH (3). An examination of various hazards associated with agriculture. Control strategies will be explored and prevention methods identified. Hazards examined include machinery, livestock, controlled spaces, pesticides, and other items common to the agricultural workplace. Lec/lab.

AG 421. ^LEADERSHIP DEVELOPMENT (3). Principles of leadership development, leadership analysis and style, record keeping procedures, youth organizations, and activities in leadership for youth. (Writing Intensive Course) **PREREQS:** Senior standing.

AG 425. DEVELOPMENTS IN AGRICULTURAL MECHANICS (3). Emphasis on the development of instructional units for agricultural instruction programs. Wide applications to agricultural mechanization and biotechnology. This course is repeatable for a maximum of 9 credits. **PREREQS:** Senior standing.

AG 442. LEADERSHIP SKILLS FOR CAREER SUCCESS (3). Focuses on the development and refinement of the following leadership skills: utilizing diversity, team building, project management, program planning models, working with difficult people, conflict management, leading change, establishing an effective network, organizational strategies, and emotional intelligence. **PREREQS:** Junior, senior or graduate standing.

AG 443. LEADERSHIP THROUGH CONVERSATIONS (3). Engages students in the exploration of conversations as a component of leadership. Students will engage in topics related to developing effective conversations, listening, conversation styles, group dynamics, digital communication, meetings as conversations and interviewing skills.

AG 444. LEADERSHIP MINOR CAPSTONE (2). Capstone course for students completing the Leadership minor. Students will reflect on what they have learned through the Leadership minor and how to apply that learning in the context of their future careers. **PREREQS:** AG 242 and AG 342

AG 492. TECHNOLOGY TRANSFER IN AGRICULTURE (3). Examination of processes by which formal and informal agricultural instruction programs influence the introduction and acceptance of technology in agriculture. An emphasis in the international arena will be maintained. The focus throughout the course will be on the role of a professional change agent working with technological change. **PREREQS:** Senior standing.

AG 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

AG 509. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

AG 518. EXTENSION COURSE IN TEACHER EDUCATION: TECHNICAL (1-3). Enables present and prospective teachers of agriculture to continue their professional development on technical topics of current importance. This course is repeatable for a maximum of 9 credits.

AG 521. LEADERSHIP DEVELOPMENT (3). Principles of leadership development, leadership analysis and style, record keeping procedures, youth organizations, and activities in leadership for youth. **PREREQS:** Graduate standing.

AG 525. DEVELOPMENTS IN AGRICULTURAL MECHANICS (3). Emphasis on the development of instructional units for agricultural instruction programs. Wide applications to agricultural mechanization and biotechnology. This course is repeatable for a maximum of 45 credits. **PREREQS:** Graduate standing.

AG 541. COMMUNITY PROGRAMS IN AGRICULTURE (3). Evaluating agricultural education program effectiveness and technical appropriateness. Development of long-range plans for agricultural programs to meet the technical needs of a community. **PREREQS:** Teaching or Extension experience will be verified by the instructor for approval.

AG 542. LEADERSHIP SKILLS FOR CAREER SUCCESS (3). Focuses on the development and refinement of the following leadership skills: utilizing diversity, team building, project management, program planning models, working with difficult people, conflict management, leading change, establishing an effective network, organizational strategies, and emotional intelligence. **PREREQS:** Junior, senior or graduate standing.

AG 543. LEADERSHIP THROUGH CONVERSATIONS (3). Engages students in the exploration of conversations as a component of leadership. Students will engage in topics related to developing effective conversations, listening, conversation styles, group dynamics, digital communication, meetings as conversations and interviewing skills.

AG 592. TECHNOLOGY TRANSFER IN AGRICULTURE (3). Examination of processes by which formal and informal agricultural instruction programs influence the introduction and acceptance of technology in agriculture. An emphasis in the international arena will be maintained. The focus throughout the course will be on the role of a professional change agent working with technological change. **PREREQS:** Graduate standing.

AG 808. WORKSHOP (1-4). This course is repeatable for a maximum of 4 credits.

ANIMAL AND RANGELAND SCIENCES

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FACULTY

Professors Borman, Downing, Filley, Froman, Killefer, Menino, Peters, Pirelli
Associate Professors Bohnert, Cherian, Deboodt, Del Curto, Estill, Hermes, Kutzler, Parsons, Schreder, Williams

Assistant Professors Bionaz, Bobe, Cooke, Delaney, Ehrhart, Johnson, Mata-Gonzalez, Morris, Mueller, Ochoa, Riggs, Sherwood, Udell

Assistant Professor (Sr. Research) Hazard

Instructors Ingham, Kennedy, Rice, Rosenlicht, Shaver

Senior Research Assistant Keller
Faculty Research Assistant Meaker

Professionals Reesman, Ross
Emeritus Professors Cheeke, Gamroth, Johnson, Koong, Males, Thompson, Weber

Distinguished Professor Emeritus Stormshak

ADJUNCT FACULTY

Kiemnec

COURTESY/AFFILIATE FACULTY

Associate Professor Stringham
Assistant Professors Bates, Boyd, Davies, Ganskopp, George, James, Louhichi, Sheley, Svejcar

Undergraduate Majors

Animal Sciences (BS, CRED, HBS)

Options

Animal Management

Pre-Veterinary Medicine/Science

Rangeland Sciences (BS, CRED, HBS)

Minors

Animal Sciences

Rangeland Ecology and Management

Graduate Majors

Animal Science (MAG, MAIS, MS, PhD)

Graduate Areas of Concentration

Animal Nutrition

Dairy Production

Embryo Physiology

Endocrinology

Growth and Development

Livestock Management

Nutritional Biochemistry

Reproductive Physiology

Rangeland Ecology and Management (MAG, MAIS, MS, PhD)

Graduate Areas of Concentration

Agroforestry

Ecology of Rangelands

Physiology of Range Plants

Range Improvement

Range Nutrition

Restoration Ecology

Riparian Zone Management

Watershed Management

Graduate Minors

Animal Sciences

Rangeland Ecology and Management

Programs in animal sciences provide up-to-date information on methods of rearing livestock and poultry, that produce meat, milk, eggs, wool, and other animal products. In addition, the department addresses the care of animals that enhance human well-being through companionship, recreation, and human aid such as horses and companion animals. Essential to this information is knowledge generated from the fields of animal behavior/bioethics, genetics, nutrition, and physiology. The various teaching and research programs explore modern areas of animal biotechnology and data processing and how they apply to present day livestock and poultry production. Study in these areas provides the core around which various curricula leading to the BS degree in Animal Sciences can be developed. To allow students flexibility in course arrangement, two specialized program options are offered.

Increasing demands for livestock and poultry products by a rapidly expanding human population mean potential employment for well-trained individuals in such areas as farm, ranch, feedlot operation; meat, poultry, egg and milk processing, meat grading with the USDA; Federal Cooperative Extension Service, county and 4-H work; sales or technical employment with commercial feed, seed, and chemical companies and pharmaceutical houses; agricultural loan officer; government agency positions at local, state and federal levels; the Peace Corps; animal welfare auditing; as well as in journalism, mass media, and public policy. The expanding support structure for companion animals has created a growing job market for graduates in areas

such as animal behavior consultant; veterinary technician (animal nurse); and business management. In addition, students become prepared to go on to advanced studies in animal sciences, veterinary medicine, and education.

Graduate students may pursue research projects through the Agricultural Experiment Station as part of their programs for MS or PhD degrees. Graduate areas of concentration are offered in animal nutrition, dairy production, embryo physiology, endocrinology, ethology, growth and development, livestock management, muscle biology and meat science, nutritional biochemistry, reproductive physiology.

COOPERATIVE PROGRAMS

Students transferring after one or two years at a community college should also be able to complete the requirements for a BS after three or two years, respectively.

RANGELAND RESOURCE MANAGEMENT

Rangeland resource management is one of the family of natural resources professions important to the social, economic, and political development of Oregon, the nation, and the world. It is based upon ecological principles and is concerned with the restoration, improvement, conservation, and use of rangelands. Since range management is practiced on lands producing domestic and wild animals, timber, water, and recreation, concepts of integrated land use are included in the curriculum. A balance among soil, domestic animal, wildlife, ecology, and other biological sciences is realized in the educational program.

The curriculum below includes university and departmental requirements for the BS degree and provides emphasis either in science, management, ecology, or allied disciplines. The BS degree is also offered on the campus of Eastern Oregon University at La Grande through an extension of the OSU Department of Animal and Rangeland Sciences. Facilities for study include classroom and field-oriented educational environments both on-campus and at locations throughout Oregon. Field trips are taken in conjunction with specific courses.

Graduate work leading to MAg, MAIS, MS, or PhD degrees may involve research on domestic or wild animals, rangeland nutrition, community ecology, physiology of rangeland plants, rangeland improvement, rangeland watershed and riparian zone management, rangeland restoration, utilization and management, agroforestry and landscape ecology.

Summer employment with private industry, government agencies, and on range research projects makes possible learning experiences while earning a salary. Employment opportunities

include resource management, research, Extension, ranch management, college and university teaching, business and industrial activities related to rangeland resources, and foreign agricultural and resource development assistance.

The **Department of Animal and Rangeland Sciences** is accredited by the Society for Range Management. It is recognized throughout the country as one of the leading institutions of rangeland management.

UNDERGRADUATE MAJORS WITH OPTIONS

ANIMAL SCIENCES (BS, CRED, HBS)

Baccalaureate Core (51)

Animal Sciences Core

- ANS 100. Orientation to Animal Sciences (2)
- ANS 121. *Introduction to Animal Sciences (4)
- ANS 207. Sophomore Seminar (1)
- ANS 251. Principles of Animal Foods Technology (3)
- ANS 311. Principles of Animal Nutrition (3)
- ANS 313. Applied Animal Nutrition: Feeds and Ration Formulation (4)
- ANS 314. Animal Physiology (4)
- ANS 316. Reproduction in Domestic Animals (4)
- ANS 317. Reproduction in Domestic Animals Laboratory (1)
- ANS 378. Animal Genetics (4)
- ANS 420. ^Ethical Issues in Animal Agriculture (3)

Three animal industries courses from:

- ANS 215. Beef/Dairy Industries (3)
- ANS 216. Sheep/Swine Industries (3)
- ANS 217. Poultry Industries (3)
- ANS 220. Introductory Horse Science (3)
- ANS 280. Companion Animal Management (3)

Two production courses from:

- ANS 430. Equine Systems I: Exercise Science (4)
- or ANS 431. Equine Systems II: Nutrition (3)
- ANS 433. Poultry Meat Production Systems (3)
- or ANS 434. Egg Production Systems (3)
- ANS 436. Sheep Production Systems (3)
- ANS 439. Dairy Production Systems (4)
- ANS 445. Beef Production Systems (4)
- ANS 456. Companion Animal Production Systems (3)

+Select TWO courses from advanced ANS classes or electives (minimum of 6 credits).

- ANS 315. *Contentious Social Issues in Animal Agriculture (3)
- ANS 321. Avian Embryo (4)
- ANS 322. Equestrian Coaching (2)
- ANS 323. Principles of Colt Training (3)
- ANS 324. Advanced Colt Training (3)
- ANS 327. Applied Physiology of Reproduction (5)
- ANS 331. Advanced Livestock Evaluation (4)

- ANS 333. Equine Stable Management (3)
- ANS 351. Advanced Principles of Animal Foods Technology (4)
- ANS 401. Research (1-16)
- ANS 410. Animal Science Internship (3 credits maximum will count toward the two-class requirement)
- ANS 511. Digestive Physiology and Nutrition of Ruminant Animals (4)
- ANS 512. Monogastric and Poultry Nutrition (3)
- ANS 415. Livestock Judging Team (3)
- ANS 435/ANS 535. Applied Animal Behavior (3)
- ANS 438. Exploring World Agriculture (2)
- ANS 441/ANS 541. Topics in Animal Learning (3)
- ANS 452/ANS 552. Livestock Housing and Waste Management (3)
- ANS 453. Practical Broiler Production (1-3)
- ANS 465. Foodborne Disease (3)
- ANS 478/ANS 578. Animal Breeding and Genetics (3)
- ANS 485/ANS 585, SOC 485/SOC 585. *Consensus and Natural Resource Issues (3)
- ANS 490/ANS 590. Toxicants and Poisonous Plants (4)
- Additional ANS Production Systems Course (3)

Select 20 credits from the Agriculture Category (Choose any courses in agricultural field or natural resources area.)

Physical and Biological Sciences

- BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)
- CH 121. General Chemistry (5) **and** CH 122, CH 123. *General Chemistry (5,5) **or** CH 231, CH 232, CH 233. *General Chemistry (4,4,4) **and** CH 261, CH 262, CH 263. *Laboratory for Chemistry 231, 232, 233 (1,1,1)
- CH 130. General Chemistry of Living Systems (4)
- or CH 331. Organic Chemistry (4)
- or BB 331. *Introduction to Molecular Biology (3)
- MB 230. *Introductory Microbiology (4)
- or MB 302. General Microbiology (3)
- MTH 111. *College Algebra (4)

Statistics

- ST 201. Principles of Statistics (4)
- or ST 351. Introduction to Statistical Methods (4)

Business

Choose one from below:

- AREC 211. Management in Agriculture (4)
- AREC 221. Marketing in Agriculture (3)
- BA 215. Fundamentals of Accounting (4)
- BA 230. Business Law I (4)
- BA 260. Introduction to Entrepreneurship (4)

Footnotes:

- * Baccalaureate Core Course
- ^ Writing Intensive Course (WIC)

OPTIONS

ANIMAL MANAGEMENT OPTION

Animal Management option students, in consultation with their academic advisor, will select 27 credits from the following

courses of which 15 credits must be upper division.

ANS 190. Introduction to Horsemanship (1)
 ANS 191. Beginning Horsemanship (1)
 ANS 192. Intermediate Horsemanship (1)
 ANS 193. Dressage (1)
 ANS 194. Jumping (1)
 ANS 221. Equine Conformation and Performance (2)
 ANS 223. Equine Marketing (2)
 ANS 231. Livestock Evaluation (2)
 ANS 295. Reining (1)
 ANS 296. Advanced Jumping/Eventing (1)
 ANS 321. Avian Embryo (4)
 ANS 322. Equestrian Coaching (2)
 ANS 323. Principles of Colt Training (3)
 ANS 324. Advanced Colt Training (3)
 ANS 327. Applied Physiology of Reproduction (5)
 ANS 331. Advanced Livestock Evaluation (4)
 ANS 333. Equine Stable Management (3)
 ANS 351. Advanced Principles of Animal Foods Technology (4)
 ANS 401. Research (1–3)
 ANS 405. Reading and Conference/Calving School (1)
 ANS 405. Reading and Conference/Dairy Evaluation (2)
 ANS 405. Reading and Conference Steer-A-Year (3)
 ANS 410. Animal Science Internship (1–12) (*Maximum of 3 credits will count.*)
 ANS 415. Livestock Judging Team (3)
 ANS 432. Equine Systems III: Reproduction (4)
 ANS 435. Applied Animal Behavior (3)
 ANS 440. Dairy Production Systems (3)
 ANS 452. Livestock Housing and Waste Management (3)
 ANS 453. Practical Broiler Production (1–3)
 ANS 478. Animal Breeding and Genetics (3)
 ANS 490. Toxicants and Poisonous Plants (4)
 ANS 511. Digestive Physiology and Nutrition of Ruminant Animals (4)
 ANS 512. Monogastric and Poultry Nutrition (3)
 ANS 538. Biology of Lactation (3)
 AREC 221. Marketing in Agriculture (3)
 CROP/CSS 310. Forage Production (4) [*CSS taught at EOU LaGrande campus only.*]
 CSS 315. ^Nutrient Management and Cycling (4) [*Taught at EOU LaGrande campus only.*]
 ECON 201. *Introduction to Microeconomics (4)
 FST 212. Dairy Processing (2)
 FST 213. Dairy Processing Laboratory (1)
 FW 475. Wildlife Behavior (4)
 FW 481. Wildlife Ecology (4)
 MB 302. General Microbiology (3)
 PHL Any upper-division philosophy course dealing with ethics (3–4)
 PHL 205. *Ethics (4)
 PSY 201. *General Psychology (3)
 PSY 202. *General Psychology (3)
 PSY 340. Cognition (4)
 RNG 341. Rangeland Ecology and Management (3)
 ST 351. Introduction to Statistical Methods (4)
 Z 350. Animal Behavior (3)

PRE-VETERINARY MEDICINE/SCIENCE OPTION

The Pre-Veterinary Medicine/Science option is designed for students interested in fulfilling requirements for admission to the OSU College of Veterinary Medicine. It allows students who are admitted to the college, upon completion of three years of undergraduate study, to apply credit earned during the first year of professional study toward the BS degree in Animal Sciences.

Students not admitted to veterinary school after completing the three-year program may complete additional requirements to qualify for the BS degree in Animal Sciences. The Pre-Veterinary Medicine/Science option is also offered for students preparing for professional careers in animal science teaching and research. More intense training is provided in the biological and physical sciences, offering an excellent foundation for graduate study. Requirements include the core curriculum and additional credits as required by the College of Veterinary Medicine.

Required Courses

BB 450, BB 451. General Biochemistry (4,4)
 CH 331, CH 332, CH 337. Organic Chemistry (4,4,4)
 BI 314. Cell and Molecular Biology (4) **and** MB 230. Microbiology (4) **or** MB 302. General Microbiology (3)
 MTH 111. *College Algebra (4) **or** MTH 112. *Elementary Functions (4) **and** MTH 241. *Calculus for Management and Social Science (4) **or** MTH 251. *Differential Calculus (4)
 PH 201, PH 202. *General Physics (5,5)

Footnote:

* Baccalaureate Core Course

RANGELAND SCIENCES (BS, CRED, HBS)

Course work credit may not be counted twice to satisfy department core or minor requirements. Departmental requirements may be utilized to satisfy baccalaureate core and non-departmental minor requirements.

Baccalaureate Core (48)¹

General Sciences and Communications (47 minimum)¹

ANS 313. Applied Animal Nutrition: Feeds and Ration Formulation (4)
 ANS 436. Sheep Production Systems (3) **or** ANS 443. Beef Production Systems (3)
 AREC 351. *Natural Resource Economics and Policy (3) **or** AREC 352. *Environmental Economics and Policy (3)
 BI 211, BI 212. *Principles of Biology (4,4)
 BI 370. Ecology (3) **or** BOT 341. Plant Ecology (4)
 BOT 321. Plant Systematics (4)
 BOT 331. Plant Physiology (4) **or** BOT 488. Environmental Physiology of Plants (3)
 BOT 414. Agrostology (4)

CH 121. General Chemistry (5)
 CH 122. *General Chemistry (5)
 CH 130. General Chemistry of Living Systems (4)
 CSS 305. Principles of Soil Science (4) [*Taught at EOU La Grande campus only.*] **or** SOIL 205. *Soil Science (4)
 CSS 306. Solving Problems: Soil Science Applications (1)[*Taught at EOU La Grande campus only.*]
 CSS 466. Soil Morphology and Classification (4) **or** SOIL 466. Soil Morphology and Classification (4)[*Taught at EOU La Grande campus only.*]
 ECON 201. *Introduction to Microeconomics (4)
 GEO 102. *The Surface of the Earth (4)
 MTH 111. *College Algebra (4)
 MTH 241. *Calculus for Management and Social Science (4)
 ST 351. Introduction to Statistical Methods (4) **or** ST 201. Principles of Statistics (4)
 WR 327. *Technical Writing (3)

Natural Resources (10 minimum)

CSS 310. Forage Production (4)[*Taught at EOU La Grande campus only.*] **or** CROP 310. Forage Production (4)
 FES 251. Recreation Resource Management (4)
 FOR 111. Introduction to Forestry (3)
 FW 251. Principles of Fish and Wildlife Conservation (3)

Rangeland Ecology and Management

RNG 341. Rangeland Ecology and Management (3)
 RNG 351. Range Ecology I-Grasslands (3)
 RNG 352. Range Ecology II-Shrublands (3)
 RNG 353. Wildland Plant Identification (4)
 RNG 355. Desert Watershed Management (3)
 RNG 421. Wildland Restoration and Ecology (4)
 RNG 441. Rangeland Analysis (4)
 RNG 442. Rangeland-Animal Relations (4)
 RNG 490. Rangeland Management Planning (4)

Free electives (16 maximum)

Total Credits=180

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

¹ Certain classes may be used to satisfy both the baccalaureate core and the rangeland ecology and management core.

UNDERGRADUATE MINORS

ANIMAL SCIENCES MINOR

Required

Select a minimum of 12 credits from any lower-division ANS courses.

And select a minimum of 15 credits from any upper-division ANS courses.

Total=27–28

Note: These courses should be taken in consultation with an academic advisor in the Department of Animal and Rangeland Sciences.

EQUINE MINOR

ANS 121. *Intro to Animal Sciences (4)
ANS 220. Introductory Horse Science (3)

Select two of the following three courses:

ANS 430. Equine Systems I: Exercise Science (4)
ANS 431. Equine Systems II: Nutrition (3)
ANS 432. Equine Systems III: Reproduction (4)

Select two courses from the following:

ANS 192. Intermediate Horsemanship (1)
ANS 193. Dressage (1)
ANS 194. Jumping (1)
ANS 295. Reining (1)
ANS 323. Principles of Colt Training (3)
ANS 324. Advanced Colt Training (3)

Select a minimum of 7-10 credits from the following:

ANS 221. Equine Conformation and Performance (2)
ANS 223. Equine Marketing (2)
ANS 313. Applied Animal Nutrition: Feeds and Ration Formulation (4)
ANS 322. Equestrian Coaching (2)
ANS 331. Advanced Livestock Evaluation (4)
ANS 333. Equine Stable Management (3)
ANS 415. Livestock Judging Team (3)

Total=28-30**12 credits must be upper division.***RANGELAND ECOLOGY AND MANAGEMENT MINOR****Requirements**

RNG 341. Rangeland Ecology and Management (3)
RNG 351. Range Ecology I-Grasslands (3)
RNG 352. Range Ecology II-Shrublands (3)
RNG 421. Wildland Restoration and Ecology (4)
RNG 442. Rangeland-Animal Relations (4)
RNG 490. Rangeland Management Planning (4)

Select 7 additional credits from:

Any other RNG course
ANS 436. Sheep Production Systems (3)
ANS 443. Beef Production Systems (3)
BOT 341. Plant Ecology (4)

Total=28

Note: Completion of the Rangeland Ecology and Management minor alone does not qualify students for rangeland conservationist positions with the U.S. Office of Personnel Management (OPM).

GRADUATE MAJORS**ANIMAL SCIENCE (MAg, MS, PhD, MAIS)**

Graduate Areas of Concentration
Animal nutrition, dairy production (MS only), embryo physiology, endocrinology, growth and development, livestock management (MS only), nutritional biochemistry, reproductive physiology

The Department of Animal and Rangeland Sciences offers graduate work leading to Master of Science and Doctor

of Philosophy degrees in Animal Science with concentrations listed above.

RANGELAND ECOLOGY AND MANAGEMENT (MAg, MS, PhD, MAIS)**Graduate Areas of Concentration**

Agroforestry, ecology of rangelands, physiology of range plants, range improvement, range nutrition, restoration ecology, riparian zone management, watershed management

The Department of Animal and Rangeland Sciences offers the Master of Agriculture, the Master of Science and the Doctor of Philosophy degrees.

The program integrates plant, soil, and animal sciences to prepare degree candidates for leadership in this professional field. Under the guidance of the rangeland faculty, graduate students study rangeland ecology, physiology of rangeland plants, rangeland nutrition, rangeland improvements, watershed management, restoration ecology, agroforestry, water quality, and riparian zone management. Through the Department of Animal and Rangeland Sciences, range management graduate students have access to greenhouse, field plot, pasture, range, and animal facilities on campus, and at the two Eastern Oregon Agricultural Research Center stations at Union and Burns.

Graduate students in rangeland ecology and management may select courses in complementary areas, including agricultural and resource economics, fisheries and wildlife, botany, soils, statistics, biology forestry, crop science, and animal science. The selection of these complementary areas depends on the interest of the students, their aptitude, and the thesis topic chosen. Minors are commonly elected in botany, soils, forage crops, animal nutrition, fisheries and wildlife, agricultural and resource economics, or in an integrated program of study.

GRADUATE MINORS**ANIMAL SCIENCE GRADUATE MINOR**

For more details, see the departmental advisor.

RANGELAND ECOLOGY AND MANAGEMENT GRADUATE MINOR

For more details, see the departmental advisor.

ANIMAL SCIENCES COURSES

ANS 100. ORIENTATION TO ANIMAL SCIENCES (2). Orientation of incoming animal sciences students to college life with emphasis on faculty, facilities, services and curricula of the Department of Animal Sciences.

ANS 121. *INTRODUCTION TO ANIMAL SCIENCES (4). Principles of breeding, physiology, nutrition, and management as they apply to

modern livestock and poultry production. Lec/lab. (Bacc Core Course)

ANS 121H. *INTRODUCTION TO ANIMAL SCIENCE (4). Principles of breeding, physiology, nutrition, and management as they apply to modern livestock and poultry production. Lec/lab. (Bacc Core Course) **PREREQS:** Honors College approval required.

ANS 190. INTRODUCTION TO HORSEMANSHIP (1). Designed for students with little to no experience in horsemanship. Students will be introduced to safe handling methods including approaching and haltering the horse, tying, leading, lunging, and grooming. Students will be familiarized with parts of the horse and tack, tack care and how to tack up a horse. In the arena, students will learn how to safely mount and dismount, basic position, cues, and control of the horse at the walk and trot. Emphasis will be placed on safety and developing the rider's balance, confidence, and control. This course is repeatable for a maximum of 3 credits. **PREREQS:** Must be able to lift, carry, push, and pull up to 50 lbs. Rider's weight must not exceed 220 lbs. Instructor approval required.

ANS 191. BEGINNING HORSEMANSHIP (1). Designed for beginning riders or those wishing to improve their basic skills. Offers an introduction to the basic Western or English (separate sections) riding position and control of the horse at the walk, trot, and lope/canter. Upon completion of the course, the student will be familiar with handling and leading a horse, grooming, tacking-up and riding simple school figures in an indoor arena. Instructors for this course will be OSU-certified coaching students or graduates. May be repeated. This course is repeatable for a maximum of 4 credits.

ANS 192. INTERMEDIATE HORSEMANSHIP (1). Designed for beginning riders who can comfortably walk, trot and canter on a trained horse. It offers a review of the basics, and opportunity to improve a rider's position and control at the trot and canter, either English or Western (Separate sections). Upon completion of the course, the student will be a more effective rider at all three gaits. This course is recommended for riders who have NOT had formal instruction or who are making a transition from the Western to English style of riding. Instructors for this course will be OSU-certified coaching students or graduates. This course is repeatable for a maximum of 4 credits. **PREREQS:** ANS 191 or equivalent.

ANS 193. DRESSAGE (1). Designed for riders who have taken Beginner Riding I and II (or the equivalent) and are interested in discovering and/or pursuing the art of dressage. Riders will be gently introduced to the terminology and techniques of dressage training through second level with ample demonstrations and hands-on experience. Upon completion of the course, riders will feel competent in riding a training level test for competition. This course is repeatable for a maximum of 4 credits. **PREREQS:** ANS 192 or equivalent.

ANS 194. JUMPING (1). Designed for riders who have taken ANS 193 (or the equivalent) and are interested in learning control of the horse over fences. Riders will be coached through several exercises designed to improve their ability to establish pace, rhythm and balance, adjust stride, and direct and control the horse over trotting and cantering poles, gymnastics, single fences, combinations, and an eight-fence hunter course. Aspects of course design will also be covered for interested students. This course is repeatable for a maximum of 4 credits. **PREREQS:** ANS 193 and / or equivalent. Departmental approval.

ANS 207. SOPHOMORE SEMINAR (1). Examination of career opportunities in animal sciences. **PREREQS:** Sophomore standing.

ANS 215. BEEF/DAIRY INDUSTRIES (3). Introduction to beef and dairy industries; history,

current industry status, and demonstration and practice of basic husbandry skills. **PREREQS:** ANS 121

ANS 216. SHEEP/SWINE INDUSTRIES (3). Introduction to the sheep and swine industries including history, current status and production practices, with demonstration and hands-on experience of basic husbandry practices. **PREREQS:** ANS 121

ANS 217. POULTRY INDUSTRIES (3). Familiarization of the organizational structure and marketing arrangement of poultry industries; hands-on managerial techniques, practices and procedures carried out by the poultry industries.

ANS 220. INTRODUCTORY HORSE SCIENCE (3). Introduction to horses, their history, breeds, form and function, performance evaluation, current industry status, and general management. **PREREQS:** ANS 121

ANS 221. EQUINE CONFORMATION AND PERFORMANCE (2). Students will learn systems of evaluating conformation and for judging current horse show disciplines typically featured in intercollegiate horse judging contests. Emphasis will be on the stock-type (AQHA) halter and performance classes. Students will learn to place classes objectively and give written and oral justifications of their judgements.

ANS 223. EQUINE MARKETING (2). Course covers practical concepts of equine marketing. Emphasis on market assessment, targeting buyers, marketing and advertising strategies, hands-on experience in product preparation and presentation, marketing legalities. **PREREQS:** ANS 121 and ANS 220 and ANS 192 or instructor approval required.

ANS 230. DAIRY CATTLE EVALUATION (3). Phenotypic evaluation of dairy cattle in relation to the productive life of the animals as well as efficiency and the economic impact on dairy producers. Labs consist of students spending time cow-side evaluating animals via knowledge gained from lectures. Cow anatomy will be mastered, value of type traits will be learned, differentiation of the dairy breeds will be understood, and oral presentation skills honed. \$20 course fee assessed. **PREREQS:** ANS 121 and ANS 215 are recommended.

ANS 231. LIVESTOCK EVALUATION (2). Visual appraisal of market and breeding classes of beef cattle, sheep, and swine. Live animal and carcass comparisons. **PREREQS:** ANS 121

ANS 251. PRINCIPLES OF ANIMAL FOODS TECHNOLOGY (3). Processing of meat, milk and eggs into human food products. Lec/lab. **PREREQS:** ANS 121

ANS 280. COMPANION ANIMAL MANAGEMENT (3). Care and management of companion animals, including dogs, cats, small mammals, reptiles, birds, and tropical fish. Responsibilities of pet ownership and the beneficial aspects of the human-animal relationship.

ANS 295. REINING (1). Reining will give the advanced rider the technical and theoretical knowledge of training reining horses in the stock seat style of riding. Focus will be on preparation and execution of the reining maneuvers. **PREREQS:** ANS 192 or instructor's approval.

ANS 296. ADVANCED JUMPING/EVENTING (1). Advanced jumping/eventing will introduce and practice training methods, conditioning, preparation, and skill building in the areas of dressage, jumping, and eventing (as weather permits). **PREREQS:** ANS 194 or instructor's approval.

ANS 302. COMMON DISEASES OF COMPANION ANIMALS (3). An introduction to common diseases of selected companion animals. Emphasis will be placed on identifying predisposing factors, clinical signs, common diagnostic procedures and potential implications

for human health. A \$10 course fee will be required. **PREREQS:** BI 211 and BI 212 and BI 213 and CH 121 and CH 122 and CH 123. ANS 280 is recommended.

ANS 311. PRINCIPLES OF ANIMAL NUTRITION (3). Classification, digestion, absorption, and metabolism of nutrients in animals; consequences of nutritional deficiencies and toxicities. **PREREQS:** ((BI 211 or BI 211H) and (BI 212 or BI 212H))

ANS 312. FEEDSTUFFS AND RATION FORMULATION (4). Presents the feedstuffs utilized by domestic animals including their characteristics and processing. Provides instruction in ration formulation and evaluation leading to development of the basic skills required to formulate and evaluate rations for domestic animals. Taught as a distance education course. **PREREQS:** ANS 121 and MTH 111 or equivalent or instructor approval.

ANS 313. APPLIED ANIMAL NUTRITION: FEEDS AND RATION FORMULATION (4). Discusses topics relevant to feedstuff identification and nutrient analysis, feed processing and formulation of balanced animal diets based on nutrient requirements. Provides students hands-on experiences in identifying various feedstuffs and formulating rations based on the nutrient composition of those feedstuffs. **PREREQS:** ANS 311 (recommended but not required) and junior status.

ANS 314. ANIMAL PHYSIOLOGY (4). Biological basis of animal performance; describes how networks of cells act cooperatively to enable locomotion, provide a stable internal environment, allocate resources, remove metabolic end-products, and counteract microorganisms. **PREREQS:** General principles of biology equivalent to BI 211, BI 212, BI 213; junior standing or higher or instructor permission.

ANS 315. *CONTENTIOUS SOCIAL ISSUES IN ANIMAL AGRICULTURE (3). Discussion of contentious issues including role of animal products and human health; use of hormones and antibodies; new animal biotechnologies; animal rights/welfare; livestock grazing on public lands. (Bacc Core Course).

ANS 316. REPRODUCTION IN DOMESTIC ANIMALS (4). Anatomy and physiology of mammalian and avian reproductive systems; fertilization, embryonic and fetal development, placentation and parturition; reproductive technologies. Lec/rec. **PREREQS:** (BI 211 or BI 211H) and (CH 121 or CH 221 or CH 231 or CH 231H) and ANS 121 and sophomore standing or higher.

ANS 317. REPRODUCTION IN DOMESTIC ANIMALS LABORATORY (1). Gross and microscopic anatomy of the reproductive tract; semen collection, evaluation and extension; evaluation of fertilization, embryo and fetal development and placentation. Lec/lab. **PREREQS:** ANS 316*

ANS 320. PRINCIPLES OF COMPANION ANIMAL NUTRITION (3). Learn about nutrients, the digestive process, and the application of nutritional sciences to the health and welfare of companion animals. Introduction to the metabolic basis and practical preventative management for nutritional diseases in companion animals. **PREREQS:** (BI 211 or BI 211H) and (BI 212 or BI 212H)

ANS 321. AVIAN EMBRYO (4). Discussion and experimentation involving the development and the environmental requirements for the artificial incubation of avian embryos. Lec/lab. Offered even-numbered years. **PREREQS:** ANS 121 and ANS 217 and BI 211

ANS 322. EQUESTRIAN COACHING (2). Practical development of coaching skills with novice to intermediate English/Western riders. Emphasis on knowledge of basic riding principles and stable management skills, teaching ability

and sport safety. Students required to enroll in a 1-credit internship program the following term for advanced teaching experience. **PREREQS:** ANS 193 and ANS 194 and ANS 221

ANS 323. PRINCIPLES OF COLT TRAINING (3). Students acquire the technical and theoretical knowledge of starting and training colts in the stock seat style of riding. **PREREQS:** ANS 295 and /or instructor's approval. Departmental approval.

ANS 324. ADVANCED COLT TRAINING (3). Students acquire the technical and theoretical knowledge of advancing the training of young horses in the stock seat style of riding. Lec/lab. **PREREQS:** ANS 295 and ANS 323 or instructor approval required.

ANS 327. APPLIED PHYSIOLOGY OF REPRODUCTION (5). Principles, techniques and recent development in semen collection, evaluation, extension and preservation; artificial insemination, estrus detection and synchronization; pregnancy diagnosis and embryo transfer. **PREREQS:** (ANS 316 and ANS 317)

ANS 331. ADVANCED LIVESTOCK EVALUATION (4). Aspects of an individual animal's economic merit are compared to a sample group. Emphasis is placed on beef, swine and sheep. Visual appraisal, performance data and carcass merit are stressed. Designed to prepare students for the intercollegiate livestock judging team. This course is repeatable for a maximum of 12 credits. **PREREQS:** ANS 231 and sophomore standing or higher.

ANS 333. EQUINE STABLE MANAGEMENT (3). Discusses developing a business plan, financial statements, and ratios, budgeting, financial planning, taxation, and employment issues within the current equine industry. **PREREQS:** ANS 220 and ANS 222 or instructor's approval.

ANS 335. EQUINE HEALTH AND DISEASE (3). Recognition of of common diseases and disorders including their cause, treatment and prevention. Management of internal and external parasites. Recognizing common lameness issues. **PREREQS:** Junior standing.

ANS 351. ADVANCED PRINCIPLES OF ANIMAL FOODS TECHNOLOGY (4). Provides in-depth coverage of both fresh and processed meats and eggs into products suitable for human consumption. **PREREQS:** ANS 251

ANS 378. ANIMAL GENETICS (4). Fundamentals of inheritance, principles of genetic segregation, population and quantitative genetics, response to natural selection and artificial manipulation of populations. **PREREQS:** BI 211 or BI 212 or BI 213 and ANS 121 or equivalent and ST 351 recommended.

ANS 401. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANS 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANS 405. READING AND CONFERENCE (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANS 407. SEMINAR (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

ANS 410. ANIMAL SCIENCE INTERNSHIP (1-12). On- or off-campus, occupational work experience supervised by the department. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANS 413. COMPARATIVE NUTRITION OF DOMESTIC AND WILD ANIMALS (3). A comprehensive discussion of comparative similarities and differences in nutrient digestion and metabolism of domestic and wild animals.

Herbivores such as ruminants and hindgut fermentors will be emphasized, as will mammalian and avian carnivorous species. Emphasis will be on protein, carbohydrate and lipid metabolism, with other topics selected from the syllabus in accordance with student interest in a particular year. Student course fee: \$10. **PREREQS:** Junior or senior status and CH 331 required. An introduction to biochemistry is recommended but not required.

ANS 415. LIVESTOCK JUDGING TEAM (3). Designed to train students for participation in the intercollegiate livestock judging team. This course is repeatable for a maximum of 9 credits. **PREREQS:** ANS 331

ANS 420. ^ETHICAL ISSUES IN ANIMAL AGRICULTURE (3). Students are provided with an opportunity to discuss, debate and write extensively about current, relevant, and controversial social issues dealing with modern animal agriculture. (Writing Intensive Course)

ANS 430. EQUINE SYSTEMS I: EXERCISE SCIENCE (4). Seniors and graduate students intensively explore and apply science to real-life situations regarding cardiorespiratory, muscle physiology, and bone physiology responses to exercise, climate, and altitude. Lec/lab. **PREREQS:** ANS 314

ANS 431. EQUINE SYSTEMS II: NUTRITION (3). Senior and graduate students intensively explore and apply science to real-life situations regarding starch, fiber, protein, and fat metabolism in performance horses, breeding stock, and growing horses. **PREREQS:** ANS 313

ANS 432. EQUINE SYSTEMS III: REPRODUCTION (4). Senior and graduate students explore the fundamentals of equine reproduction and their application in horse breeding. Includes practical training of laboratory techniques. Lec/lab. **PREREQS:** (ANS 220 and ANS 316) and ANS 327

ANS 433. POULTRY MEAT PRODUCTION SYSTEMS (3). Fundamental applications and the analysis of management principles applied to brooding, rearing, feeding and housing meat-type chickens and turkeys and their respective breeders. Decision case studies and practical management problems are incorporated into the course. Offered odd number years. **PREREQS:** ANS 217 and ANS 313 and ANS 316 and ANS 378 or instructor's approval

ANS 434. EGG PRODUCTION SYSTEMS (3). Applications and analyses of egg production systems for brooding, rearing, feeding and housing egg producing chickens. Decision case studies and practical management problems are incorporated into the course. Offered even-numbered years. **PREREQS:** ANS 217 and ANS 313 and ANS 316 and ANS 378 or instructor's approval

ANS 435. APPLIED ANIMAL BEHAVIOR (3). Exploration of the fundamental processes of animal behavior and implications for animal management, production, housing and welfare. Examples provided in class will cover a range of species, with emphasis on domestic animals. Lec/lab. **PREREQS:** ANS 314 and BI 350 or Z 350 or equivalent.

ANS 436. SHEEP PRODUCTION SYSTEMS (3). Integration of nutrition, genetics, reproduction, behavior, and health principles into management systems for production and marketing of lamb and wool. **PREREQS:** ANS 216 and ANS 311 and ANS 316 and ANS 378

ANS 438. EXPLORING WORLD AGRICULTURE (2). Survey of crop and livestock production in a designated section of the world, including history, culture, and political situation. Course is designed to prepare students for a tour of study area. **CROSSLISTED** as AREC 438, CROP 438, CSS 438, HORT 438. Graded P/N. This course is repeatable for a maximum of 8 credits.

ANS 439. DAIRY PRODUCTION SYSTEMS (4). Fundamentals of nutrition, breeding, reproductive physiology and health programs and their applications in the care and management of dairy cattle. **PREREQS:** ANS 215 and ANS 313 and ANS 316 and ANS 378

ANS 440. DAIRY PRODUCTION SYSTEMS (3). Decision case analysis or special topics in application of dairy management principles. **PREREQS:** ANS 439

ANS 441. TOPICS IN ANIMAL LEARNING (2). Studies of animals' cognitive abilities have revealed a broad spectrum of learning capabilities in various species. Covers fundamental concepts associated with animal learning and cognition; the focus is on types of learning demonstrated by various animals and challenges associated with designing animal cognition experiments. Readings will cover a range of species. **PREREQS:** BI 211 and BI 212 and BI 213 and (BI 350 or Z 350) and junior standing. Recommended: ANS 435 or ANS 535.

ANS 443. BEEF PRODUCTION SYSTEMS: COW/CALF (3). Fundamentals of nutrition, reproductive physiology and health programs and their applications in the care and management of beef cattle. Overnight field trip with extra fee charged. Lec/lab. Taught at EOU La Grande campus only. **PREREQS:** ANS 313 and ANS 315 and ANS 316 and ANS 378

ANS 444. BEEF PRODUCTION SYSTEMS: STOCKER/FEEDLOT (3). Continuation of the study of beef cattle management. Students will practice decision-making processes using area beef cattle operations as case studies. Overnight field trip with extra fee charged. Taught at EOU La Grande campus only. **PREREQS:** ANS 443 or ANS 543

ANS 445. BEEF PRODUCTION SYSTEMS (4). Students will be exposed to the fundamentals of nutrition, reproductive physiology, selection, health programs, and their applications in the care and management of beef cattle from conception through calving, weaning, stocker/back grounding and the feedlot. Students will practice decision-making processes using working case studies. Overnight field trip with extra fee charged. **PREREQS:** ANS 313 and ANS 316 and ANS 317 and ANS 378

ANS 452. LIVESTOCK HOUSING AND WASTE MANAGEMENT (3). Basics in where, how, and why one would build, insulate, and ventilate livestock buildings. Manure and wastewater collection, treatment, storage, and utilization.

ANS 453. PRACTICAL BROILER PRODUCTION (1-3). Students will be considered the growers and will be required to provide the management of the flock. The instructor will act the field supervisor, making suggestions for management changes if the student growers do not make timely adjustments. Students will be closely involved with the day-to-day responsibilities of broiler production, in a system virtually identical to that used in the commercial industry nationwide. They will be determining management, including ventilation, temperature, lighting, water, and feed availability. Attendance in the form of two visits per day (weekends included) is a major component of the class. All decisions on management are under the indirect supervision of the instructor. This course is repeatable for a maximum of 9 credits. **PREREQS:** Instructor approval required.

ANS 456. COMPANION ANIMAL PRODUCTION SYSTEMS (3). Fundamentals of dog and cat breeding stock selection, feeding and housing as well as biology and management from estrus through parturition to weaning. Due to the nature of this class, a variety of animals may be present during class session. Questions and interactions are encouraged but, while precautions are taken, any contact with animals carries some risk of injury or illness. **PREREQS:** (ANS 313 and ANS 316 and ANS 317 and ANS 378) and senior standing.

ANS 460. SWINE PRODUCTION SYSTEMS (4). Students will be exposed to the fundamentals of nutrition, reproductive physiology, selection, health programs, and their applications in the care and management of swine from conception through farrowing, weaning, and the growing/finishing phases. Students will practice decision-making processes using working case studies. Overnight field trip with extra fee charged. **PREREQS:** ANS 121 and ANS 216 and ANS 311 and ANS 316 and ANS 378

ANS 465. FOODBORNE DISEASE (3). Examines ways pathogenic bacteria can enter the human diet via animal products, discusses rationale for the limitations of government meat inspection, explains disease symptoms in terms of intestinal physiology, and discusses food processing technology and food handling techniques that serve to minimize the risk of infection.

ANS 485. *CONSENSUS AND NATURAL RESOURCES (3). Students will use a working group approach. They will select a natural resource topic, study the team process and interaction as a method of learning, explore the issue using systems practice, and strive for consensus on solutions to their issue. **CROSSLISTED** as FES 485/FES 585, FS 485/FS 585, FW 485/FW 585, SOC 485/SOC 585. (Bacc Core Course)

ANS 490. TOXICANTS AND POISONOUS PLANTS (4). Natural toxicants and their biological effects, metabolism of toxicants, impacts of toxicants on livestock production, and consideration of the chemical structure, plant sources, toxicity problems, metabolism and metabolic effects, toxicity signs, and prevention of toxicoses. **PREREQS:** ANS 313

ANS 495. PHYSIOLOGICAL CHEMISTRY (4). Comprehensive analysis of the biochemical properties and pathways that characterize a living animal. **PREREQS:** ANS 314 and BB 350 or equivalent.

ANS 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ANS 501. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANS 503. THESIS (1-16). Graded P/N. This course is repeatable for a maximum of 999 credits.

ANS 505. READING AND CONFERENCE (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANS 507. GRADUATE SEMINAR (1). Section 1: Seminar/general for all graduate students. Preparation of effective visual aids. Practice explaining the validity or significance of experimental results to an informed audience. Section 2: Seminar/endocrinology, for graduate students interested in physiology. This course is repeatable for a maximum of 99 credits.

ANS 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

ANS 509. TEACHING PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

ANS 511. DIGESTIVE PHYSIOLOGY AND NUTRITION OF RUMINANT ANIMALS (4). Anatomy and physiology of the ruminant digestive tract including rumen microbiology and digestive processes. Nutritional biochemistry and physiology of ruminants. Feed chemistry, feed intake and principles of ration balancing. Theory of energy and protein metabolism. **PREREQS:** ANS 311 or ANS 313

ANS 512. MONOGASTRIC AND POULTRY NUTRITION (3). Anatomical differences in digestive tracts of monogastrics; nutritional biochemistry of poultry; practical feeding of avian species; least-cost ration techniques; techniques for determining nutrient needs of monogastrics. **PREREQS:** ANS 311 and ANS 313

ANS 513. COMPARATIVE NUTRITION OF DOMESTIC AND WILD ANIMALS (3). A comprehensive discussion of comparative similarities and differences in nutrient digestion and metabolism of domestic and wild animals. Herbivores such as ruminants and hindgut fermentors will be emphasized, as will mammalian and avian carnivorous species. Emphasis will be on protein, carbohydrate and lipid metabolism, with other topics selected from the syllabus in accordance with student interest in a particular year. Student course fee: \$10. **PREREQS:** Junior or senior status and CH 331 required. An introduction to biochemistry is recommended but not required.

ANS 515. REVIEW OF APPLIED RUMINANT NUTRITION RESEARCH TECHNIQUES (3). Review and discussion and applied techniques and methodology used for ruminant nutrition research.

ANS 530. EQUINE SYSTEMS I: EXERCISE SCIENCE (4). Senior and graduate students intensively explore and apply science to real-life situations regarding cardiorespiratory, muscle physiology, and bone physiology responses to exercise, climate, and altitude. Lec/lab. **PREREQS:** ANS 314

ANS 531. EQUINE SYSTEMS II: NUTRITION (3). Senior and graduate students intensively explore and apply science to real-life situations regarding starch, fiber, protein, and fat metabolism in performance horses, breeding stock, and growing horses. **PREREQS:** ANS 313

ANS 532. EQUINE SYSTEMS III: REPRODUCTION (4). Designed for seniors and graduate students to explore the fundamentals of equine reproduction and their application in horse breeding. Includes practical training in laboratory techniques. Lec/lab. **PREREQS:** ANS 220 and ANS 316 and ANS 327

ANS 533. POULTRY MEAT PRODUCTION SYSTEMS (3). Fundamental applications and the analysis of management principles applied to brooding, rearing, feeding and housing meat-type chickens and turkeys and their respective breeders. Decision case studies and practical management problems are incorporated into the course. Offered odd number years. **PREREQS:** ANS 217 and ANS 313 and ANS 316 and ANS 378 or instructor's approval

ANS 534. EGG PRODUCTION SYSTEMS (3). Applications and analyses of egg production systems for brooding, rearing, feeding and housing egg producing chickens. Decision case studies and practical management problems are incorporated into the course. Offered even-numbered years. **PREREQS:** ANS 217 and ANS 313 and ANS 316 and ANS 378 or instructor's approval

ANS 535. APPLIED ANIMAL BEHAVIOR (3). Exploration of the fundamental processes of animal behavior and implications for animal management, production, housing and welfare. Examples provided in class will cover a range of species, with emphasis on domestic animals. Lec/lab. **PREREQS:** ANS 314 and BI 350 or Z 350 or equivalent.

ANS 536. SHEEP PRODUCTION SYSTEMS (3). Integration of nutrition, genetics, reproduction, behavior, and health principles into management systems for production and marketing of lamb and wool. **PREREQS:** ANS 216 and ANS 311 and ANS 316 and ANS 378

ANS 538. BIOLOGY OF LACTATION (3). Physiological and environmental factors affecting mammary gland development and function. Offered alternate years. **PREREQS:** Z 431 or Z 531

ANS 539. DAIRY PRODUCTION SYSTEMS (4). Fundamentals of nutrition, breeding, reproductive physiology and health programs and their applications in the care and management of dairy cattle. **PREREQS:** ANS 215 and ANS 313 and ANS 316 and ANS 378

ANS 540. DAIRY PRODUCTION SYSTEMS (3). Decision case analysis or special topics in application of dairy management principles. **PREREQS:** ANS 439

ANS 541. TOPICS IN ANIMAL LEARNING (2). Studies of animal's cognitive abilities have revealed a broad spectrum of learning capabilities in various species. This course covers fundamental concepts associated with animal learning and cognition; the focus is on types of learning demonstrated by various animals and challenges associated with designing animal cognition experiments. Readings will cover a range of species. **PREREQS:** Junior standing.

ANS 543. BEEF PRODUCTION SYSTEMS: COW/CALF (3). Fundamentals of nutrition, reproductive physiology and health programs and their applications in the care and management of beef cattle. Overnight field trip with extra fee charged. Lec/lab. Taught at EOU La Grande campus only. **PREREQS:** ANS 315 and ANS 313 and ANS 316 and ANS 378

ANS 544. BEEF PRODUCTION SYSTEMS: STOCKER/FEEDLOT (3). Continuation of the study of beef cattle management. Students will practice decision-making processes using area beef cattle operations as case studies. Overnight field trip with extra fee charged. Taught at EOU La Grande campus only. **PREREQS:** ANS 443 or ANS 543

ANS 545. BEEF PRODUCTION SYSTEMS (4). Students will be exposed to the fundamentals of nutrition, reproductive physiology, selection, health programs, and their applications in the care and management of beef cattle from conception through calving, weaning, stocker/back grounding and the feedlot. Students will practice decision-making processes using working case studies. Overnight field trip with extra fee charged. **PREREQS:** ANS 313 and ANS 316 and ANS 317 and ANS 378

ANS 552. LIVESTOCK HOUSING AND WASTE MANAGEMENT (3). Basics in where, how, and why one would build, insulate, and ventilate livestock buildings. Manure and wastewater collection, treatment, storage, and utilization. Offered alternate years.

ANS 556. COMPANION ANIMAL PRODUCTION SYSTEMS (3). Fundamentals of dog and cat breeding stock selection, feeding and housing as well as biology and management from estrus through parturition to weaning. Due to the nature of this class, a variety of animals may be present during class session. Questions and interactions are encouraged but, while precautions are taken, any contact with animals carries some risk of injury or illness. **PREREQS:** ANS 313 and ANS 316 and ANS 317 and ANS 378 and senior standing.

ANS 560. LIPID METABOLISM (3). Digestion, absorption and metabolism of lipids with emphasis on lipoprotein metabolism, regulation of lipid metabolism in various tissues and metabolism of eicosanoids. Offered alternate years. **PREREQS:** BB 452 and BB 492 or equivalent

ANS 585. CONSENSUS AND NATURAL RESOURCES (3). Students will use a working group approach. They will select a natural resource topic, study the team process and interaction as a method of learning, explore the issue using systems practice, and strive for consensus on solutions to their issue. **CROSSLISTED** as FES 485/FES 585, FS 485/FS 585, FW 485/FW 585, SOC 485/SOC 585.

ANS 590. TOXICANTS AND POISONOUS PLANTS (4). Natural toxicants and their biological effects, metabolism of toxicants, impacts of toxicants on livestock production, and consideration of the chemical structure, plant sources, toxicity problems, metabolism and metabolic effects, toxicity signs, and prevention of toxicoses. **PREREQS:** ANS 313

ANS 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ANS 601. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANS 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

ANS 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANS 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

ANS 607. GRADUATE SEMINAR (1). This course is repeatable for a maximum of 99 credits.

ANS 608. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

ANS 609. TEACHING PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

ANS 662. HORMONE ACTION (3). Mechanisms of action of peptide and steroid hormones and related compounds at the cellular level. Offered every other year, winter term. **CROSSLISTED** as BB 662, MCB 662, PHAR 662. **PREREQS:** BB 451 or BB 551 or BB 492 or BB 592

ANS 673. BIOLOGY OF MAMMALIAN REPRODUCTION (4). Physiological, neuroendocrine, endocrine and environmental factors that regulate reproduction of mammals. Offered alternate years. **PREREQS:** ANS 316 or equivalent and BB 350

ANS 699. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

■ RANGELAND ECOLOGY AND MANAGEMENT COURSES

RNG 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

RNG 299H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

RNG 341. RANGELAND ECOLOGY AND MANAGEMENT (3). Nature and management of rangelands. Integrated land use with emphasis on plant-animal-soil interactions.

RNG 346. TOPICS IN WILDLAND FIRE (3). An interdisciplinary survey of concepts relating to fire science, ecology, management, and policy. Includes case studies of several representative ecosystems, ranging from west- and eastside forests of the Pacific Northwest to shrub steppe ecosystems of the Intermountain West and chaparral ecosystems of southern California. Distance and campus-based delivery using videos, website, and discussion. **CROSSLISTED** as FOR 346, FW 346. **PREREQS:** Course work in forest biology or ecology (e.g. FOR 240, FOR 341) or equivalent.

RNG 351. RANGE ECOLOGY I-GRASSLANDS (3). Principles and terminology of grassland ecology. Addresses the spatial-temporal dynamics of structure, function, and process in North American grassland ecosystems. Water, nutrient cycles and energy pathways are explored in context of the variable driving forces of climate (drought), herbivory, and fire. **PREREQS:** (BOT 313 and RNG 341)

RNG 352. RANGE ECOLOGY II-SHRUBLANDS (3). Introduces the ecology of shrublands using an autecological approach. Explores the effects of stressors such as temperature, drought, fire, and herbivory on plant morphology, physiology, reproduction, and growth. Covers life histories of common shrubs and descriptions of shrubland communities used to promote understanding of autecological principles. **PREREQS:** (BOT 313 and RNG 341)

RNG 353. WILDLAND PLANT IDENTIFICATION (4). Students will learn how to identify approximately 100 plant species found in wildlands of North America and Mexico. Individual plant species ecology, basic plant anatomy and identification characteristics observable only through a microscope or dissecting scope, and how to use a dichotomous key for plant ID will also be covered.

RNG 355. DESERT WATERSHED MANAGEMENT (3). Principles and methods in managing rangeland for optimum production and regulation of water yields, as well as maintaining soil stability and on-site productivity. Effects of grazing herbivores and their potential as land use, manipulative tools. Concepts of arid land hydrology, with emphasis on the resultant effects on runoff quantity and quality.

RNG 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

RNG 403. SENIOR THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

RNG 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

RNG 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

RNG 411. ADVANCED PLANT ID (2). Advanced rangeland plant taxonomy. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

RNG 421. WILDLAND RESTORATION AND ECOLOGY (4). Emphasis is placed on understanding the ecology of arid and semi-arid ecosystems through the study of ecological processes responsible for ecosystem function. Range improvement practices for stabilizing and repairing degraded wildlands by directing autogenic recovery mechanisms are discussed. This involves manipulating plants, soil, animals and microenvironments for improved ecosystem function. **PREREQS:** Course work in soils and ecology. Field trip required.

RNG 436. WILDLAND FIRE SCIENCE AND MANAGEMENT (4). Principles and applications of fire as a natural resource management tool, the role of fire in conservation management, restoration, and preservation of ecosystems. Covers basic techniques and current research used to describe fire behavior and spread, fuels and fuel manipulation, and fire effects on the biota. Focus will be on fire as a natural process in ecosystem dynamics. Lec/lab. **CROSSLISTED** as FOR 436/FOR 536.

RNG 441. RANGELAND ANALYSIS (4). Techniques used to describe vegetation in shrub-lands, grasslands, and forests. Use of measurements in resource management. Course is field-oriented, emphasizing both theory and practice of wildland inventory methods. **PREREQS:** (ST 351 or ST 351H)

RNG 442. RANGELAND-ANIMAL RELATIONS (4). Domestic and wild animal use of rangelands as related to environmental factors, palatability, food habits, nutrition, physiography, and their effects on management of rangeland-animal resources. **PREREQS:** RNG 341

RNG 446. WILDLAND FIRE ECOLOGY (3). Coverage of fire histories and ecology of major forest, rangeland and wetland ecosystems. Includes fire interactions with physical and biotic components of ecosystems, role of fire in ecological processes, and utilization in natural resource management. **CROSSLISTED** as FOR 446/FOR 546 and FW 446/FW 546. **PREREQS:** Course work in ecology and natural resource management.

RNG 455. RIPARIAN ECOLOGY AND MANAGEMENT (3). Study of the ecology of riparian vegetation, including successional processes in riparian zones, productivity, structure and diversity of riparian ecosystems. The class

is focused on the terrestrial vegetation, soils and animals of riparian ecosystems. Emphasis is placed on the past abuse associated with riparian ecosystems, methods of rehabilitation, and theories of the proper use of riparian ecosystems under a multiple-use philosophy (i.e. fish, wildlife, livestock, aesthetics, recreation, and silviculture). **PREREQS:** RNG 355

RNG 477. *AGROFORESTRY (3). Theory and worldwide practice of multiple-crop low input sustainable systems involving concurrent production of tree and agricultural products. Biological, economic, social, and political factors that underlie the application of agroforestry technology. **CROSSLISTED** as FS 477/FS 577, NR 477/NR 577. (Bacc Core Course) **PREREQS:** Any basic ecology course.

RNG 490. RANGELAND MANAGEMENT PLANNING (4). Administration and management of rangelands; planning processes involving goal setting, inventories, personnel management, environment, conflict resolution, and other constraints necessary for decision-making. Use of data collected from field problems to support the execution of class plans. Field trip required. Lec/lab.

RNG 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

RNG 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

RNG 503. MASTER'S THESIS (1-16). This course is repeatable for a maximum of 999 credits.

RNG 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

RNG 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

RNG 507. SEMINAR (1-2). This course is repeatable for a maximum of 16 credits.

RNG 521. WILDLAND RESTORATION AND ECOLOGY (4). Emphasis is placed on understanding the ecology of arid and semi-arid ecosystems through the study of ecological processes responsible for ecosystem function. Range improvement practices for stabilizing and repairing degraded wildlands by directing autogenic recovery mechanisms are discussed. This involves manipulating plants, soil, animals and microenvironments for improved ecosystem function.

RNG 536. WILDLAND FIRE SCIENCE AND MANAGEMENT (4). Principles and applications of fire as a natural resource management tool, the role of fire in conservation management, restoration, and preservation of ecosystems. Covers basic techniques and current research used to describe fire behavior and spread, fuels and fuel manipulation, and fire effects on the biota. Focus will be on fire as a natural process in ecosystem dynamics. Lec/lab. **CROSSLISTED** as FOR 436/FOR 536.

RNG 541. RANGELAND ANALYSIS (4). Techniques used to describe vegetation in shrub-lands, grasslands, and forests. Use of measurements in resource management. Course is field-oriented, emphasizing both theory and practice of wildland inventory methods. **PREREQS:** ST 351

RNG 542. RANGELAND-ANIMAL RELATIONS (4). Domestic and wild animal use of rangelands as related to environmental factors, palatability, food habits, nutrition, physiography, and their effects on management of rangeland-animal resources. **PREREQS:** RNG 341

RNG 546. WILDLAND FIRE ECOLOGY (3). Coverage of fire histories and ecology of major forest, rangeland and wetland ecosystems. Includes fire interactions with physical and biotic components of ecosystems, role of fire in ecological processes, and utilization in natural

resource management. **CROSSLISTED** as FOR 446/FOR 546 and FW 446/FW 546. **PREREQS:** Course work in ecology and natural resource management.

RNG 555. RIPARIAN ECOLOGY AND MANAGEMENT (3). Study of the ecology of riparian vegetation, including successional processes in riparian zones, productivity, structure and diversity of riparian ecosystems. The class is focused on the terrestrial vegetation, soils and animals of riparian ecosystems. Emphasis is placed on the past abuse associated with riparian ecosystems, methods of rehabilitation, and theories of the proper use of riparian ecosystems under a multiple-use philosophy (i.e. fish, wildlife, livestock, aesthetics, recreation, and silviculture). **PREREQS:** RNG 355

RNG 577. AGROFORESTRY (3). Theory and worldwide practice of multiple-crop low input sustainable systems involving concurrent production of tree and agricultural products. Biological, economic, social, and political factors that underlie the application of agroforestry technology. **CROSSLISTED** as FS 477/FS 577, NR 477/NR 577. **PREREQS:** Any basic ecology course.

RNG 590. RANGELAND MANAGEMENT PLANNING (4). Administration and management of rangelands; planning processes involving goal setting, inventories, personnel management, environment, conflict resolution, and other constraints necessary for decision-making. Use of data collected from field problems to support the execution of class plans. Field trip required. Lec/lab.

RNG 601. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

RNG 603. DOCTORAL THESIS (1-16). This course is repeatable for a maximum of 999 credits.

RNG 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

RNG 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

RNG 607. SEMINAR (1-2). This course is repeatable for a maximum of 16 credits.

RNG 608. WORKSHOP (1-16).

RNG 643. WILDLAND PLANT ECOPHYSIOLOGY (4). Emphasizes the physiological ecology of plants living in arid and semi-arid ecosystems. Primary class emphasis will include photosynthesis, respiration, water stress and water use efficiency, stable isotopes, root structure and function, nutrient uptake and stress, and defoliation. Offered every other winter, odd years.

RNG 661. AGRICULTURAL RESEARCH PERSPECTIVES (3). Planning and managing agricultural research projects, publishing research results, professional ethics, interactions of science, scientists, and society. Offered on alternate years.

RNG 662. RANGELAND ECOLOGY (3). Studies ecological theory and related resource management implications in rangelands and arid wildlands. Topics include the history and development of rangeland ecology, plant demography, invasive species, plant population dynamics, disturbance theory, succession, vegetation classification and range condition assessments. Offered every other winter, even years. **PREREQS:** A course in basic ecology recommended.

RNG 670. ECOLOGICAL INVASIVE PLANT MANAGEMENT (2). Logic of ecologically based invasive plant management. Ecological processes of invasion. Management of plant succession with emphasis on augmentive restoration. Adaptive management of weed invasions into natural ecosystems. Development of ecologically based management plans for natural ecosystems. Offered odd-numbered years only.

APPLIED ECONOMICS

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Website: <http://oregonstate.edu/aecgradprogram/>

FACULTY

Professors Antle, Capalbo, Färe, Jaeger, Lev, Munisamy, Seavert, Sylvia, Weber, Wu

Associate Professors Diebel, Durham, Eleveld, Langpap, Lewis, Reimer, Riggs, Sterns

Assistant Professors Chen, Kling

Instructors Brekken, Egelkraut, Fisher, Fleming, Gow, Gwin, Haim, Rahe, Sorte

Emeritus R. Adams, Barkley, Buccola, Johnston, Kerkvliet, McMullen

ADJUNCT FACULTY

D. Adams, Albers, Bernell, Boggess, Elston, Landkamer, Montgomery, Rosenberger, Talbott

AEC GRADUATE FACULTY

The Graduate Program in Applied Economics currently has 40 faculty members drawn from three departments and two schools in five colleges.

Albers, Alig, Antle, Bernell, Boggess, Buccola, Capalbo, Chen, Chi, Cross, Diebel, Durham, Eleveld, Färe, Fisher, Gopinath, Harte, Jaeger, Kerkvliet, Kline, Kling, Langpap, Lev, Lewis, Maness, McMullen, Meng, Montgomery, Plantinga, Pugatch, Reimer, Rosenberger, L. Schroeder, Seavert, Sessions, Sterns, Sylvia, Weber, Wu, Yoon

Undergraduate Majors

Agricultural Business Management (BS, CRED, HBS)

Environmental Economics and Policy (BS, HBS)

Options

Environmental Economics

Environmental Policy

General Option (Also available via Ecampus.)

Minors

Agricultural Business Management

Natural Resource and Environmental Law and Policy
Resource Economics (Also available via Ecampus.)

Graduate Major

Applied Economics (MA, MAIS, MS, PhD)

Graduate Areas of Concentration

Resource and Environmental Economics

Trade and Development

Public Health Economics

Transportation Economics (MA/MS only)

Graduate Minor

Applied Economics

The Department of Applied Economics offers the Bachelor of Science degree in Agricultural Business Management and the Bachelor of Science degree in Environmental Economics and Policy. These degrees open doors to exciting careers in the traditional areas of commercial agriculture, agricultural business management, and agricultural policy, and in the newer career areas of natural resource and environmental management, marine resources, international trade and development, rural growth and change, and environmental and resource law.

The Agricultural Business Management (ABM) major prepares students for unique challenges and opportunities in agricultural business careers. It combines economic and business principles and their application to farms and ranches, companies processing and marketing farm products, and companies supplying goods and services to farmers and other businesses. The curriculum combines skills in marketing, business management, accounting, and economic analysis with a minor appropriate to a student's professional goals and interests.

CAREER OPPORTUNITIES FOR UNDERGRADUATES

Graduates may pursue a number of attractive career opportunities. Agricultural Business Management (ABM) majors may move directly into professional jobs with agribusiness firms, financial and insurance institutions, or manage their own agribusinesses. Environmental Economics and Policy (EEP) students can serve effectively as members of interdisciplinary teams involved in resource and environmental management, planning, and policy analysis. Government job opportunities include management, planning, and analysis positions with federal, state, and local government agencies. Private company opportunities include similar positions with utility companies, banks, consulting firms, and resource management companies. The EEP degree also provides an excellent foundation for graduate work in economics, as well as law, public policy, and urban planning.

GRADUATE PROGRAM IN APPLIED ECONOMICS

The Graduate Program in Applied Economics offers the MS and PhD degrees in Applied Economics. Graduates pursue academic, analytical, and policy careers in universities, consulting, trade associations, firms, and government. Core course work consists of microeconomic and macroeconomic theory, econometrics, and other quantitative methods. Field (concentration) and elective courses include natural resources and the environment, energy, trade, economic development, marine and coastal resources, and health care. Program emphasis is on theory's applications to real-world settings, institutions, and problems. Faculty are in the Applied Economics Department; the Colleges of Forestry, Agricultural Sciences, and Liberal Arts; the College of Earth, Ocean, and Atmospheric Sciences; and the School of Public Health and Human Sciences.

UNDERGRADUATE MAJORS WITH OPTIONS**AGRICULTURAL BUSINESS MANAGEMENT (BS, HBS)**

The BS in Agricultural Business Management (ABM) degree curriculum blends course work in agricultural economics, business, agricultural sciences, computer science, arts, and humanities so that graduates can respond to the unique challenges and opportunities in agribusiness vocations.

All ABM students must select a minor (minimum of 27 credits) appropriate to their professional goals and interests. An internship or project is required to integrate course work with business-oriented experiences.

AREC 211. Management in Agriculture (4)
AREC 221. Marketing in Agriculture (3)
AREC 250. *Introduction to Environmental Economics and Policy (3)
 or ECON 201. *Introduction to Microeconomics (4)
AREC 300. Applied Economic Analysis (3)
BA 211. Financial Accounting (4)
BA 213. Managerial Accounting (4)
ECON 202. *Introduction to Macroeconomics (4)
MTH 111. *College Algebra (4)
MTH 241. *Calculus for Management and Social Science (4)
ST 351. Introduction to Statistical Methods (4)
WR 121. *English Composition (3)
WR 323. *English Composition (3)
 or WR 327. *Technical Writing (3)
Note: Students must receive a C– or above in the courses above. If a student receives below a “C–” he or she must retake the course.

BS Degree Requirements (180)**Baccalaureate Core (48)
Agricultural and Resource
Economics Core Courses**

- AREC 121. Discovering Agricultural and Resource Economics (2)
 AREC 211. Management in Agriculture (4)
 AREC 221. Marketing in Agriculture (3)
 AREC 250. *Introduction to Environmental Economics and Policy (3)
 or ECON 201. *Introduction to Microeconomics (4)
 AREC 300. Applied Economic Analysis (3)
 AREC 406. Projects (6)
 or AREC 410. Internship (6)
 AREC 442. Agricultural Business Management (4)
 AREC 461. ^Agricultural and Food Policy Issues (4)
 AREC 465. M/Agricultural Financial Reporting and Analysis (3)

Quantitative Courses**Choose two courses from the following list:**

- AREC 447. Agricultural Price and Market Analysis (4)
 ECON 424. Introduction to Econometrics (4)
 ST 352. Introduction to Statistical Methods (4)

Upper-Division Business Courses**Choose two from the following list:**

- BA 347. International Business (4)
 BA 351. Managing Organizations (4)
 BA 390. Marketing (4)
 BA/FIN 441. Financial Institutions (4)
 BA 463. Family Business Management (4)
 BA/MRTK 492. Consumer Behavior (4)
 BA/MRKT 493. Advertising Management (4)
 BA/MRKT 495. Retail Management (4)
 BA/MRKT 497. Global Marketing (4)

Choose a minimum of 12 credits from upper-division AREC or ECON courses or others as approved by advisor.**Business Administration**

- BA 211. Financial Accounting (4)
 BA 213. Managerial Accounting (4)
 BA 233. Legal Environment of Business (2)
 BA 360. Introduction to Financial Management (4)

Computers and Technology**Choose one course from below:**

- AG 111. Computer Applications in Agriculture (3)
 CS 101. Computers: Applications and Implications (4)

Social Sciences

- ECON 202. *Introduction to Macroeconomics (4)

Communications

- WR 323. *English Composition (3)
 or WR 327. *Technical Writing (3)

Mathematics

- MTH 111. *College Algebra (4)
 MTH 241. *Calculus for Management and Social Science (4)

Statistics

- ST 351. Introduction to Statistical Methods (4)

Required Minor (27)

Appropriate to student's professional goals and interests.

Footnotes:

- * Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

ENVIRONMENTAL ECONOMICS AND POLICY (BS, HBS)

Students pursuing the BS in Environmental Economics and Policy degree must choose one of three options:

1. The **Environmental Economics Option** focuses on development of strong economic and statistical skills and their use in the analysis, while providing flexibility to incorporate interests in the biological, physical or social sciences.
2. The **Environmental Policy Option** focuses on course work in environmental sciences, political sciences, and related subject areas with a greater focus on the socio-economic dimensions of environmental sciences.
3. The **General Option** allows the greatest flexibility for students to create their own curriculum, including senior research projects.

OPTIONS**ENVIRONMENTAL ECONOMICS OPTION**

The Environmental Economics option focuses on development of strong economic and statistical skills and their use in the analysis, while providing flexibility to incorporate interests in the biological, physical or social sciences.

Agricultural and Resource Economics

- AREC 121. Discovering Agricultural and Resource Economics (2)
 AREC 250. *Introduction to Environmental Economics and Policy (3)¹
 or ECON 201. *Introduction to Microeconomics (4)¹
 AREC 253. *Environmental Law, Policy, and Economics (4)
 AREC 311. Microecon: Tools for Consumer Choice/Production Efficiency (4)¹
 AREC 313. Welfare Economics and Resource Policy (3)
 AREC 351. *Natural Resource Economics and Policy (3)
 AREC 352. *Environmental Economics and Policy (3)
 AREC 434. ^Measuring Resource and Environmental Impacts (4)
 ECON 424. Introduction to Econometrics (4)

AREC, ECON, FOR or MRM Courses: 20 credits upper-division courses from the following list (or approved by advisor):

- AREC 399H. Special Topics: "Environment, Sustainability and Quality of Life" (1)
 AREC 432. Environmental Law (4)
 AREC 448. Advanced Readings in Environmental Economics and Policy(1)

- AREC 450. Valuing Ecosystem Services (1)
 AREC 452. Marine Economics (3)
 AREC 454. Rural Development Economics and Policy (3)
 AREC 456. Economics of Water Conservation (1)
 AREC 457. Economics and Global Climate Change (1)
 AREC 458. Economics of Sustainable Growth and Development (1)
 AREC 475. M/Negotiation in Business and Resource Management (1)
 ECON 407. Seminar: Energy Economics (4)
 ECON 439. ^Public Policy Analysis (4)
 ECON 461. Law, Economics and Regulation (4)
 ECON 465. Transportation Economics (4)
 FOR 330. Forest Conservation Economics (4)
 FOR 331. Forest Resource Economics II (4)
 FES 432. Economics of Recreation Resources (4)
 FOR 457. Techniques for Forest Resource Analysis (4)
 FOR 460. ^Forest Policy (4)
 FOR 462. Natural Resource Policy and Law (3)

Social Sciences

- ECON 202. *Introduction to Macroeconomics (4)¹

Computers and Technology

- AG 111. Computer Applications in Agriculture (3)
 or CS 101. Computers: Applications and Implications (4)

Communications

- WR 121. *English Composition (3)¹
 WR 214. *Writing in Business (3)
 or WR 222. *English Composition (3)
 COMM 111. *Public Speaking (3)
 or COMM 114. *Argument and Critical Discourse (3)
 WR 323. *English Composition (3)¹
 or WR 327. *Technical Writing (3)¹

Mathematics

- MTH 111. *College Algebra (4)¹
 MTH 112. *Elementary Functions (4)¹
 MTH 251. *Differential Calculus (4)¹

Statistics

- ST 351. Introduction to Statistical Methods (4)¹

Health and Human Performance

- HHS 231. *Lifetime Fitness for Health (2)
 HHS 241-248. *Lifetime Fitness: (various activities) (1)
 or any PAC Course

Synthesis (must be in different departments)

Contemporary Global Issues
 Science, Technology and Society

Perspectives**(2 classes allowed in same dept.)**

- Physical Science
 Biological Science
 One additional Physical or Biological Science
 Western Culture
 Cultural Diversity
 Literature and the Arts
 Social Processes

Difference, Power and Discrimination

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

¹ C– or above required

**ENVIRONMENTAL
POLICY OPTION**

The Environmental Policy option focuses on course work in environmental sciences, political sciences, and related subject areas with a greater focus on the socio-economic dimensions of environmental sciences.

**Agricultural and Resource
Economics**

AREC 121. Discovering Agricultural and Resource Economics (2)

AREC 250. *Introduction to Environmental Economics and Policy (3)¹

or ECON 201. *Introduction to Microeconomics (4)¹

AREC 253. *Environmental Law, Policy, and Economics (4)

AREC 311. Microecon: Tools for Consumer Choice/Production Efficiency (4)¹

AREC 313. Welfare Economics and Resource Policy (3)

AREC 351. *Natural Resource Economics and Policy (3)

AREC 352. *Environmental Economics and Policy (3)

AREC 434. ^Measuring Resource and Environmental Impacts (4)

AREC, ECON or FOR Courses:

**Choose 10 credits upper-division
courses from the following list:**

AREC 399H. Special Topics: "Environment, Sustainability and Quality of Life" (1)

AREC 448. Advanced Readings in Environmental Economics and Policy (1)

AREC 450. Valuing Ecosystem Services (1)

AREC 452. Marine Economics (3)

AREC 454. Rural Development Economics and Policy (3)

AREC 456. Economics of Water Conservation (1)

AREC 457. Economics and Global Climate Change (1)

AREC 458. Economics of Sustainable Growth and Development (1)

AREC 475. M/Negotiation in Business and Resource Management (1)

ECON 407. Projects: Energy Economics (4)

ECON 461. Law, Economics and Regulation (4)

FES 432. Economics of Recreation Resources (4)

FOR 460. ^Forest Policy (4)

**Choose three classes from the
following:**

AREC 432. Environmental Law (4)

BI 301. *Human Impacts on Ecosystems (3)

FOR 462. Natural Resource Policy and Law (3)

FW 415. Fisheries and Wildlife Law and Policy (3)

PS 475. Environmental Politics and Policy (4)

PS 476. *Science and Politics (4)

PS 477. International Environmental Politics and Policy (4)

SOC 448. Law and Society (3)

**Choose two classes from the
following:**

BI 370. Ecology (3)

CSS 305. Principles of Soil Science (4)
[*Taught at EOU La Grande campus only.*]

and CSS 306. Problem Solving: Soil Science Applications (1) [*Taught at EOU La Grande campus only.*]

or SOIL 205. *Soil Science (4)

FOR 111. Introduction to Forestry (3)

FW 251. Principles of Fish and Wildlife Conservation (3)

FW 350. *Endangered Species, Society and Sustainability (3)

OC 331. Introduction to Oceanography (3)

RNG 341. Rangeland Ecology and Management (3)

Social Sciences

ECON 202. *Introduction to Macroeconomics (4)¹

PS 201. *Introduction to U.S. Government and Politics (4)

SOC 204. *Introduction to Sociology (3)

Computers and Technology

AG 111. Computer Applications in Agriculture (3)

or CS 101. Computers: Applications and Implications (4)

GEO 365. Introduction to Geographic Information Systems (4)

Communications

WR 121. *English Composition (3)¹

WR 214. *Writing in Business (3)

or WR 222. *English Composition (3)

COMM 111. *Public Speaking (3)

or COMM 114. *Argument and Critical Discourse (3)

WR 323. *English Composition (3)¹

or WR 327. *Technical Writing (3)¹

Mathematics

MTH 111. *College Algebra (4)¹

MTH 241. *Calculus for Management and Social Science (4)¹

Statistics

ST 351. Introduction to Statistical Methods (4)¹

**Quantitative Courses—choose two
courses from below:**

AREC 447. Agricultural Price and Market Analysis (4)

ECON 424. Introduction to Econometrics (4)

ST 352. Introduction to Statistical Methods (4)

Health and Human Performance

HHS 231. *Lifetime Fitness for Health (2)

HHS 241–248. *Lifetime Fitness: (various activities) (1)
or any PAC Course

Synthesis

(must be in different departments)

Contemporary Global Issues

Science, Technology and Society

Perspectives

(2 classes allowed in same dept.)

One Bacc Core Chemistry Class

Biological Science

One additional Physical or Biological Science

Western Culture

Cultural Diversity

Literature and the Arts

Social Processes

Difference, Power and Discrimination

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

¹ C– or above required

GENERAL OPTION

Available via Ecampus.

The General option allows the greatest flexibility for students to create their own curriculum, including senior research projects.

**Agricultural and Resource
Economics**

AREC 250. *Introduction to Environmental Economics and Policy (3)¹

or ECON 201. *Introduction to Microeconomics (4)¹

AREC 253. *Environmental Law, Policy, and Economics (4)

AREC 300. Applied Economic Analysis (3)¹

or AREC 311. Microecon: Tools for Consumer Choice/Production Efficiency (4)¹

AREC 313. Welfare Economics and Resource Policy (3)

AREC 351. *Natural Resource Economics and Policy (3)

AREC 352. *Environmental Economics and Policy (3)

AREC 406. Projects (6)

AREC 432. Environmental Law (4)

AREC 434. ^Measuring Resource and Environmental Impacts (4)

AREC, ECON, FOR or PS Courses:

(16 credits upper division)

Two classes from the following:

BI 370. Ecology (4)

CSS 305. Principles of Soil Science (4)
[*Taught at EOU La Grande campus only.*]

or SOIL 205. *Soil Science (4)

FOR 111. Introduction to Forestry (3)

FW 251. Principles of Fish and Wildlife Conservation (3)

FW 350. *Endangered Species, Society and Sustainability (3)

OC 331. Introduction to Oceanography (3)

RNG 341. Rangeland Ecology and Management (3)

Social Sciences

ECON 202. *Introduction to Macroeconomics (4)¹

PS 201. *Introduction to U.S. Government and Politics (4)

SOC 204. *Introduction to Sociology (3)

Computers and Technology

AG 111. Computer Applications in Agriculture (3)

GEO 365. Introduction to GIS (4)

Communications

WR 121. *English Composition (3)¹

WR 214. *Writing in Business (3)

or WR 222. *English Composition (3)

COMM 111. *Public Speaking (3)

or COMM 114. *Argument and Critical Discourse (3)

WR 323. *English Composition (3)¹

or WR 327. *Technical Writing (3)¹

Mathematics

MTH 111. *College Algebra (4)¹
 MTH 112. *Elementary Functions (4)¹
 MTH 251. *Differential Calculus (4)¹

Statistics

ST 351. Introduction to Statistical Methods (4)¹
 ST 352. Introduction to Statistical Methods (4)

Health and Human Performance

HHS 231. *Lifetime Fitness for Health (2)
 HHS 241–248. *Lifetime Fitness: (various activities) (1)
 or any PAC Course

Synthesis (must be in different departments)

Contemporary Global Issues
 Science, Technology and Society

Perspectives (2 classes allowed in same dept.)

One Bacc Core Chemistry Class
 Biological Science
 One additional Physical or Biological Science
 Western Culture
 Cultural Diversity
 Literature and the Arts
 Social Processes
 Difference, Power and Discrimination

Footnotes:

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)
¹ C– or above required

UNDERGRADUATE MINORS**AGRICULTURAL BUSINESS MANAGEMENT MINOR**

The Agricultural Business Management minor is available to students who are not pursuing the ABM major. Business Administration majors planning to minor in Agricultural Business Management must see both a College of Business advisor and a Department of Applied Economics advisor to discuss certain course restrictions in the minor. Business majors must choose alternate courses to replace the credits that are also in the Business Administration major.

Each minor in the Applied Economics Department is created to provide students within and outside the discipline the opportunity to study a secondary area. Each minor requires 27 credits of course work in addition to the student's major. At least 12 of the 27 credits must be upper division. No credits counted toward the minor can be courses also counted toward the student's major.

- Agricultural Business Management (ABM) majors may not elect to complete an Agricultural Business Management.
- Environmental Economics and Policy (EEP) majors may not elect to complete a Resource Economics or Natural Resource and Environmental Law and Policy minor.

Required Courses (14–15 credits)

AREC 211. Management in Agriculture (4)
 AREC 221. Marketing in Agriculture (3)
 AREC 250. *Introduction to Environmental Economics and Policy (3)
 or ECON 201. *Introduction to Microeconomics (4)
 AREC 311. Microecon: Tools for Consumer Choice/Production Efficiency (4)

Students will work with the academic advisor in the Department of Applied Economics to select additional courses for a total of 27 credits.

Total=27**NATURAL RESOURCE AND ENVIRONMENTAL LAW AND POLICY MINOR**

The Natural Resource and Environmental Law and Policy Minor is available to students who are not pursuing the EEP major.

Each minor in the Applied Economics Department is created to provide students within and outside the discipline the opportunity to study a secondary area. Each minor requires 27 credits of course work in addition to the student's major. At least 12 of the 27 credits must be upper division. No credits counted toward the minor can be courses also counted toward the student's major.

- Agricultural Business Management (ABM) majors may not elect to complete an Agricultural Business Management minor.
- Environmental Economics and Policy (EEP) majors may not elect to complete a Resource Economics or Natural Resource and Environmental Law and Policy minor.

Required Courses (11 credits)

AREC 253. *Environmental Law, Policy and Economics (4)
 AREC 432. Environmental Law (4)
 FOR 462. Natural Resource Policy and Law (3)

Students will work with the academic advisor in the Department of Applied Economics to select additional courses for a total of 27 credits.

Total=27**RESOURCE ECONOMICS MINOR****Also available via Ecampus.**

The Resource Economics minor is available to students who are not pursuing the EEP major.

Each minor in the Applied Economics Department is created to provide students within and outside the discipline the opportunity to study a secondary area. Each minor requires 27 credits of course work in addition to the student's major. At least 12 of the 27 credits must be upper division. No credits counted toward the minor can be courses also counted toward the student's major.

- Agricultural Business Management (ABM) majors may not elect to

complete an Agricultural Business Management minor.

- Environmental Economics and Policy (EEP) majors may not elect to complete a Resource Economics or Natural Resource and Environmental Law and Policy minor.

Required Courses (16–17 credits)

AREC 250. *Introduction To Environmental Economics and Policy (3)
 or ECON 201. *Introduction to Microeconomics (4)
 AREC 311. Microecon: Tools for Consumer Choice/Production Efficiency (4)
 AREC 313. Welfare Economics and Resource Policy (3)
 AREC 351. *Natural Resource Economics and Policy (3)
 AREC/ECON 352. *Environmental Economics and Policy (3)
 ECON 202. *Introduction to Macroeconomics (4)

Students will work with the academic advisor in the Department of Applied Economics to select additional courses for a total of 27 credits.

Total=27**APPLIED ECONOMICS (MA, MS, PhD, MAIS)****Graduate Areas of Concentration**

Resource and environmental economics, trade and development, public health economics, and transportation economics (MA, MS only)

The Applied Economics Graduate Program provides students with a strong foundation in economic theory, and quantitative methods while reserving sufficient flexibility to specialize in their areas of interest. The core curriculum includes courses in microeconomic and macroeconomic theory, in quantitative methods, and includes a set of qualifying examinations. Additional course work is required in the areas of concentration, which include: research and environmental economics, trade and development, public health economics, transportation economics, and an open area of concentration. The open area can accommodate students' interests in applied economic policy, sustainable development, food and climate policy, and marine issues. The hallmark of the Applied Economics Graduate Program is the training of students to understand and utilize economic theories, principles, and methods to examine real-world problems with significant attention to data, institutions, and context.

Since faculty from across campus are members of the graduate faculty in Applied Economics, and are potential research advisors, the Applied Economics Graduate Program allows students to work with faculty who most closely match their interests.

These faculty reside in many academic departments at Oregon State University,

including the Department of Applied Economics, the School of Public Policy, the Department of Forest Ecosystems and Society, the Department of Forest Resources, Engineering and Management, and the College of Public Health and Human Sciences. Many students are supported by graduate teaching or graduate research assistantships. The Graduate School website also provides information related to financing your graduate education.

For detailed information on the Applied Economics Graduate Program, please review the web page at <http://arec.oregonstate.edu/aec> or contact Dr. Steve Buccola, Director of Admissions, Applied Economics Graduate Program, 213 Ballard Extension Hall, OSU, Corvallis, OR 97331 or phone:541-737-1410, or email: applied.economics@oregonstate.edu.

GRADUATE MINORS

APPLIED ECONOMICS GRADUATE MINOR

For detailed information on the Applied Economics Graduate Program, please review the web page at <http://arec.oregonstate.edu/aec> or contact Dr. Steve Buccola, Director of Admissions, Applied Economics Graduate Program, 213 Ballard Extension Hall, OSU, Corvallis, OR 97331 or phone:541-737-1410, or email: applied.economics@oregonstate.edu.

RURAL STUDIES GRADUATE MINOR

Rural communities—both in the U.S. and globally—face an extraordinarily complex set of challenges due to sparse settlements and geographic isolation, exacerbated by globalization and technological change in an interdependent urban-rural system. Addressing these challenges requires both the theoretical insights of multiple disciplines and the practical wisdom that derives from engagement in solving actual problems in rural places. Emerging approaches to the study of rural people and places offer opportunities to examine rural issues from the perspective of multiple disciplines and diverse research methods that can capture the complexities at the intersections of place and space. Yet graduate training programs in these new approaches to rural studies are scarce.

Offered through campus and field-based experiential education, the graduate minor in Rural Studies provides students with the skills and competencies needed to understand economic, social, political and cultural dynamics of rural places.

The Rural Studies minor complements and supports other programs at OSU including the Master of Public Policy's concentration in rural policy and other graduate programs where students and

faculty engage in rural issues such as applied economics, anthropology, forest ecosystems and society, geosciences, and human development and family sciences.

Required Core (7 credits)

FS/RS 511, FS/RS 611X. Communities and Natural Resources (5)
RS 512X. Introduction to Rural Studies (1)
RS 513X. Contemporary Rural Issues (1)

Required (Minimum 11 credits)

ANTH 571. Cash, Class and Culture: Hunter-Gatherers to Capitalism (4)
ANTH 581. Natural Resources and Community Values (4)
ANTH 584. Wealth and Poverty (3)
ANTH 582. Anthropology of International Development (3)
ANTH 586. Anthropology of Food (2–6)
ANTH 599. Special Topics: Ethnographic FieldSchool 1-16
ANTH 599. Special Topics: Rural Anthropology (3)
AREC 554. Rural Development Economics and Policy (3)
ENG 582. Studies in American Literature, Culture, and the Environment (3)
ES 544. Native American Law: Tribes, Treaties, and the U.S. (3)
ES 548. Native American Philosophies (3)
GEO 520. Geography of Resource Use (3)
GEO 523. Land Use in the American West (3)
GEO 526. Third-World Resource Development (3)
GEO 552. Principles and Practices of Rural and Resource Planning (3)
HDFS 547. Families and Poverty (3)
H 520. Health Disparities (3)
PS 553. The Geopolitics of Oil and Energy (4) [*Pending approval*]
RS 502. Independent Study (1–16)
PS 575. Environmental Politics and Policy (4)
SNR 520. Social Aspects of Sustainable Natural Resources (3) [*Ecampus only*]
SOC 526. Social Inequality (4)
SOC 554. Leisure and Culture (4)
SOC 556. Science and Technology in a Social Context (4)
SOC 560. Comparative Societies (4)
SOC 566. International Development: Gender Issues (4)
SOC 575. Rural Sociology (4)
SOC 580. Environmental Sociology (4)
SOC 581. Society and Natural Resources (4)

Total=18 credits

■ APPLIED ECONOMICS COURSES

AEC 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.
AEC 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits.
AEC 503. THESIS/DISSERTATION (1-16). This course is repeatable for a maximum of 999 credits.
AEC 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.
AEC 506. SPECIAL PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.
AEC 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

AEC 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

AEC 512. MICROECONOMIC THEORY I (4). Fundamental topics in microeconomic theory. Topics include utility maximization and consumer demand, profit maximization and the theory of the firm, and labor and capital markets. **PREREQS:** AREC 312 and MTH 252 or equivalent.

AEC 513. MICROECONOMIC THEORY II (4). Emphasizes principles for microeconomic theory at the master's level. Builds upon the foundations covered in AEC 512, and extends the theory and principles to cover uncertainty, game theory, competitive market equilibrium and welfare analysis, imperfect competition, and market failures. Primary emphasis is on understanding microeconomic theory and the underlying assumptions, and how it is applied to real world settings. **PREREQS:** AEC 512

AEC 515. MACROECONOMIC THEORY (4). Macroeconomic theory and policy that covers the historical foundations and evolution of modern macroeconomic thought. Topics include the equilibrium determination of output, employment, prices, wages, and interest rates; the causes and consequences of economic fluctuations; monetary and fiscal policies; micro-foundations; and the role of expectations. **PREREQS:** ECON 315 and MTH 251 or equivalent.

AEC 523. PRELIMINARIES FOR QUANTITATIVE METHODS (4). Examines mathematical and statistical topics essential for subsequent courses in graduate-level econometric analysis and quantitative methods. The course focuses on matrix algebra, probability and distribution theory (emphasizing joint and conditional distributions), statistical inference, properties of estimators, and iterative methods for solving non-linear systems. **PREREQS:** (ST 351 or ST 352 or ECON 424 or ECON 524) and MTH 253

AEC 525. APPLIED ECONOMETRICS (4). General principles of applied econometric research are emphasized, including model building, data analysis, hypothesis testing, and evaluation and interpretation of results. A variety of estimators are applied to real data, including least squares, panel data, simultaneous equations, discrete choice, and limited dependent variable models.

AEC 599. SPECIAL TOPICS (1-16). Various topics in applied economics of special and current interest not covered in other courses. This course is repeatable for a maximum of 16 credits.

AEC 601. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

AEC 602. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits.

AEC 603. THESIS/DISSERTATION (1-16). This course is repeatable for a maximum of 999 credits.

AEC 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

AEC 606. SPECIAL PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

AEC 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

AEC 608. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

AEC 611. ADVANCED MICROECONOMIC THEORY I (4). A rigorous development of the theory of consumption and production, with emphasis on duality. **PREREQS:** (AEC 512 and AEC 513) and MTH 254 or equivalent.

AEC 612. ADVANCED MICROECONOMIC THEORY II (4). A rigorous extension of the theory of the consumer and firm to aggregate and heterogeneous populations, decision making under uncertainty, and related game theory concepts. **PREREQS:** AEC 611

AEC 613. ADVANCED MICROECONOMIC THEORY III (4). A rigorous development of the theory of competitive equilibrium, market power, public goods, and information. **PREREQS:** AEC 612

AEC 615. ADVANCED MACROECONOMIC THEORY (4). Introduction to modern macroeconomic theory on economic growth and fluctuations, including a review of Keynesian theory, optimal control theory and dynamic programming, exogenous and endogenous growth models, government budget deficit and debt, and unemployment theories. **PREREQS:** Intermediate macroeconomics or equivalent.

AEC 625. ADVANCED ECONOMETRICS I (4). Emphasizes basic theory underlying the main types of estimators used in econometrics, as well as their application in empirical research. Includes derivation, properties, and application of ordinary and generalized method of moments, maximum likelihood, and ordinary and generalized least squares estimators, statistical inference and hypothesis testing, and model building and specification analysis. **PREREQS:** AEC 523

AEC 626. ADVANCED ECONOMETRICS II (4). Extensions to the generalized linear regression model are considered: discrete choice, limited dependent variable, panel data, and simultaneous equations models, and new solutions to identification problems. Strong applied orientation, emphasizing problems of data measurement, model selection and specification. **PREREQS:** AEC 625

AEC 627. COMPUTATIONAL ECONOMICS (4). Covers the numerical analysis of static optimization models and stochastic dynamic models in resource and development economics, emphasizing formulation, solution, and simulation of dynamic optimization, rational expectations, and arbitrage pricing models. **PREREQS:** (AEC 512 and AEC 523)

AEC 699. SPECIAL TOPICS (1-16). Various topics in applied economics of special and current interest not covered in other courses. This course is repeatable for a maximum of 16 credits.

■ AGRICULTURAL AND RESOURCE ECONOMICS COURSES

AREC 121. DISCOVERING AGRICULTURAL AND RESOURCE ECONOMICS (2). Explore issues, opportunities, and challenges in the dynamic and diverse employment field of agricultural and resource economics. Case studies and field trips.

AREC 199. SPECIAL TOPICS (1-4). Targeted courses that focus on specific topics in agricultural and resource economics. Topics may vary from term to term and from year to year. May be repeated for credit when topics differ. This course is repeatable for a maximum of 8 credits.

AREC 211. MANAGEMENT IN AGRICULTURE (4). Economic and business principles applied to the management of agribusiness firms, including farms and ranches; goal-setting and management information; planning and decision-making tools; acquiring, organizing, and managing land, labor, and capital resources. **PREREQS:** (AREC 250 or ECON 201 or ECON 201H) and .

AREC 221. MARKETING IN AGRICULTURE (3). Organization and functions of domestic and international markets; market channels for various agricultural commodities; role of agribusiness, cooperatives, and government in marketing decisions. **PREREQS:** (AREC 250 or ECON 201 or ECON 201H)

AREC 240. *RURAL ECONOMICS OF PLACE AND PEOPLE (3). Provides perspective on issues influencing rural communities and economic development in rural America. People, places and natural resources of rural communities play a vital role in economic vitality of the West, yet rural landscapes are changing faster than many urban counterparts.

AREC 250. *INTRODUCTION TO ENVIRONMENTAL ECONOMICS AND POLICY (3). Examines how economic forces and social institutions cause environmental degradation and help build management solutions. Explains key economic concepts for valuing environmental resources and evaluating the trade-offs of alternative management approaches from private markets to regulation. Applies the concepts and theories to topical environmental issues such as water pollution and conserving biodiversity. (Bacc Core Course) **PREREQS:** MTH 111 or equivalent is recommended.

AREC 253. *ENVIRONMENTAL LAW, POLICY, AND ECONOMICS (4). A general introduction to federal environmental law and policy in the U.S. Familiarizes students with basic legal institutions and concepts of the American legal system, outlines the transition of environmental policy from its common law roots to its modern administrative law form, and gives an overview of the major federal environmental statutes. Relationships among legal theory and process and economic principles are emphasized. (Bacc Core Course)

AREC 299. SPECIAL TOPICS (1-4). Targeted courses that focus on specific topics in agricultural and resource economics. Topics may vary from term to term and from year to year. May be repeated for credit when topics differ. This course is repeatable for a maximum of 8 credits.

AREC 300. APPLIED ECONOMIC ANALYSIS (3). An intermediate level primer of microeconomic principles focusing on consumption and production theory and its application in the agriculture industry. The course serves as a bridge between principles of economics and intermediate economic theory courses. Both abstract and mathematical formulations of economic principles are emphasized. **PREREQS:** ((ECON 201 or ECON 201H or AREC 250) and MTH 241)

AREC 311. MICROECON: TOOLS FOR CONSUMER CHOICE/PRODUCTION EFFICIENCY (4). An examination of the theories of consumer behavior and demand, production cost, the firm, supply, and competitive and monopoly market structures. **PREREQS:** (AREC 250 or ECON 201 or ECON 201H and (MTH 241 or MTH 251 or MTH 251H)) and .

AREC 313. WELFARE ECONOMICS AND RESOURCE POLICY (3). Focuses on the intermediate microeconomic theory of social welfare and decision-making. Topics include welfare theory, externalities and public goods, public choice, uncertainty, asymmetric information, and cost-benefit analysis. Substantial attention will be given to the implications of these theories for real-world problems, especially regarding resource and environmental issues. **PREREQS:** (AREC 311 or ECON 311)

AREC 351. *NATURAL RESOURCE ECONOMICS AND POLICY (3). Application of principles of economics to identify the causes, consequences, and ways of dealing with natural resource problems, including problems associated with fisheries, forests, water resources, and land. Conceptual topics and policy applications. Emphasis is on developing students' skill in applying an economic way of thinking about natural resource management. (Bacc Core Course) **PREREQS:** (AREC 250 or ECON 201 or ECON 201H) and MTH 111

AREC 352. *ENVIRONMENTAL ECONOMICS AND POLICY (3). Provides an overview of the interrelationships between economic activity, the environment, and public policy. Through case studies, discussion groups, readings, and group activities, students learn how economists define and analyze environmental problems and the types of policies they advocate for managing environmental quality. **CROSSLISTED** as ECON 352. (Bacc Core Course) **PREREQS:** AREC 250 or ECON 201 or ECON 201H

AREC 371. TOPICS IN GLOBALIZATION (1). Surveys current economics issues associated with globalization.

AREC 372. AGRICULTURAL COOPERATIVES (3). An introduction to and in-depth examination of the agricultural cooperative. Students will gain a working knowledge of the concepts, principles, and terminology of agricultural cooperatives through reference materials, lectures, presentations by guest speakers and a cooperatives tour. Students will consider the strengths and weaknesses of the agricultural cooperative as well as the unique management and operational challenges inherent to this form of business operation.

AREC 382. FARM AND RANCH APPRAISAL (4). An introduction to appraisal of rural real estate, including methods of valuing property, different types of appraisals, and preparation and interpretation of an appraisal report. Not offered every year. **PREREQS:** (ECON 201 or ECON 201H or AREC 250) and AREC 211) and or instructor approval.

AREC 388. AGRICULTURAL LAW (4). Application of legal principles to business decision making in farming, ranching, and the agricultural support industry. Consideration of the obligations arising out of contract, tort, property, water, public land, and natural resource law. Not offered every year.

AREC 399. SPECIAL TOPICS (1-4). Targeted courses that focus on specific topics in agricultural and resource economics. Topics may vary from term to term and from year to year. May be repeated for credit when topics differ. This course is repeatable for a maximum of 8 credits.

AREC 399H. SPECIAL TOPICS (1-4). Targeted courses that focus on specific topics in agricultural and resource economics. Topics may vary from term to term and from year to year. May be repeated for credit when topics differ. This course is repeatable for a maximum of 8 credits. **PREREQS:** Honors College approval required.

AREC 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

AREC 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

AREC 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Senior standing, departmental approval required.

AREC 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

AREC 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

AREC 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

AREC 407H. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

AREC 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

AREC 410. INTERNSHIP (1-6). Practical on-the-job training in agricultural business, marketing, commercial agricultural production, or related private or public organizations. Graded P/N. This course is repeatable for a maximum of 6 credits. **PREREQS:** Junior or senior standing. Submission and approval of pre-internship work plans. Internship program coordinator approval required.

AREC 421. ECONOMICS OF RURAL POVERTY AND THE U.S. SOCIAL SAFETY NET (4). Examines the geography of poverty in the United States and the "social safety net" that the U.S. has constructed to reduce poverty and its negative effects. Understand the geographical consequences of federal policies and the

challenges of providing social safety net programs in rural areas.

AREC 432. ENVIRONMENTAL LAW (4). Legal relationships arising out of rights to air, water, and land. The impact of federal and state regulation on pollution control and on the production, use, and disposal of hazardous materials. **PREREQS:** Junior standing.

AREC 434. ^MEASURING RESOURCE AND ENVIRONMENTAL IMPACTS (4). Examines economic perspectives on the allocation of natural resources and the management of environmental quality, emphasis on the use of economic concepts in the design and evaluation of public policies. Not offered every year. (Writing Intensive Course) **PREREQS:** AREC 313

AREC 438. EXPLORING WORLD AGRICULTURE (2). Survey of crop and livestock production in a designated section of the world, including history, culture, and political situation. Course is designed to prepare students for a tour of study area. Not offered every year. **CROSSLISTED** as ANS 438, CROP 438, CSS 438, HORT 438. Graded P/N. This course is repeatable for a maximum of 8 credits.

AREC 441. AGRICULTURAL FINANCIAL MANAGEMENT (4). Principles of financial management in production agriculture and agribusiness; financial statements, budgets, and capital investment analysis; business organization forms; legal aspects of borrowing; sources and terms of agricultural credit; taxation. EOU campus only. **PREREQS:** AREC 211 and (AREC 300 or AREC 311) and BA 340

AREC 442. AGRICULTURAL BUSINESS MANAGEMENT (4). Application of economic, financial, and strategic management principles to agricultural business with a focus on a case-study framework for analysis and business decision making for alternative business management strategies.

AREC 444. COMMODITY FUTURES AND OPTIONS MARKETS (4). Provides an overview of the basic concepts needed to use commodity futures and options markets to successfully manage price risk. To address the increasingly global economy in which commodity transactions occur, the course also includes financial futures such as interest rates and currencies. Specific topics covered include contract standardization, speculation and hedging, opening and closing of positions, and basis, i.e. the relationship between cash and futures markets, input-output hedges, and spreads. Students also gain hands-on experience through a trading simulation.

AREC 447. AGRICULTURAL PRICE AND MARKET ANALYSIS (4). Price determination for agricultural commodities and factors; quantitative analysis of prices, factors and markets; agricultural market structures, performance, and roles of institutions. Lec/lab. **PREREQS:** (AREC 300 or AREC 311 or ECON 311) and AREC 370 and ST 351.

AREC 448. ADVANCED READINGS IN ENVIRONMENTAL ECONOMICS AND POLICY (1). Introduces advanced theories and applications of environmental economics to selected policy concerns in the PNW and more globally. Attention will be directed to the methodology underpinnings of environmental policies and instruments using case studies on current, real world management issues. Offered in winter term odd years. **PREREQS:** (AREC 311 and AREC 351 and AREC 352)

AREC 449. RENEWABLE ENERGY ALTERNATIVES: ECONOMICS AND TECHNOLOGY (1). An overview of sustainable energy concepts and economic issues relevant to understanding the potential role of renewable energy in the nation's total energy mix. Offered even years. **PREREQS:** (AREC 250 or ECON 201)

AREC 450. VALUING ECOSYSTEM SERVICES (1). Explores the economic dimensions of policies that are impacted by and target ecosystem

services, including markets for ecosystem services, and the connections to institutions, regulations, and societal preferences. Offered in winter term odd years. **PREREQS:** (AREC 351 or AREC 352)

AREC 452. MARINE ECONOMICS (3). Economic aspects of marine resource utilization and management will be analyzed. Topics include open access aspect of marine resources; conflict and allocation of marine resources, marine resource markets, marine recreation, pollution, and aquaculture, with special emphasis on commercial fisheries. Offered every fall in odd years. **PREREQS:** (AREC 351 or AREC 352)

AREC 454. RURAL DEVELOPMENT ECONOMICS AND POLICY (3). Theories of economic change in developed and less-developed economies; natural resource sectors and the development of rural regions, with emphasis on growth, diversification, and instability; resource mobility and the spatial aspects of development; poverty and inequality; rural development policy. Not offered every year. **PREREQS:** (AREC 300 or AREC 311)

AREC 456. ECONOMICS OF WATER CONSERVATION (1). Students will analyze water conservation by examining the relationship between economic and technological efficiency in water systems and management; and the competition between water and energy needs. Offered in spring term even years. **PREREQS:** (AREC 311 and AREC 313)

AREC 457. ECONOMICS AND GLOBAL CLIMATE CHANGE (1). Uses economic concepts to explore and critically assess the economic impacts of climate change and policies to address both mitigation and adaptation. Attention will be directed to the global dimensions of these resource issues, recent and proposed policies to address the climate change, and focus on the agricultural sectors in the PNW and globally. Offered in winter term even years. **PREREQS:** (AREC 311 and AREC 351 and AREC 352)

AREC 458. ECONOMICS OF SUSTAINABLE GROWTH AND DEVELOPMENT (1). Uses economic concepts to explore and critically assess fundamental questions about economic growth, development, and sustainability. Offered in winter term even years. **PREREQS:** (AREC 250 or ECON 201)

AREC 460. CAPITAL INVESTMENT ANALYSIS USING AGTOOLS (3). Learn and understand the important factors in measuring the impacts of implementing technologies and/or conservation practices, adding value to products, or changing cropping systems or livestock enterprises. The AgTools TM software programs will be used to apply financial and economic principles to better understand and reduce the financial, production, marketing, and human resource risks facing agribusinesses.

AREC 461. ^AGRICULTURAL AND FOOD POLICY ISSUES (4). Principles of agricultural and food policy formulation; agricultural adjustment processes; agricultural price and income policies in relation to land use, water, and rural development policies; interrelationships among U.S. and foreign agriculture and trade policies. (Writing Intensive Course) **PREREQS:** (AREC 250 or ECON 201 or ECON 201H) and (AREC 300 or AREC 311 or ECON 311)

AREC 462. THE ECONOMIC HISTORY OF AMERICAN AGRICULTURE (3). Focuses on the historical development of the agricultural industry in the United States from the time of settlement through recent times. The colonial years, expansion into Western territories, development of new technologies, and the eventual emergence of government as an important force in agriculture receive special attention. The relationship between agriculture and the remainder of the economy call attention to poverty, money and banking, pure food laws, and the reaction to the New Deal.

AREC 465. M/AGRICULTURAL FINANCIAL REPORTING AND ANALYSIS (3). Covers balance sheet, income statement, statement of cash flows, and statement of owner equity, using standards outlined by the Farm Financial Records Task Force. Also the use of ratios to evaluate financial performance. **PREREQS:** AREC 211 and AREC 300 and BA 215 and BA 340

AREC 467. M/CAPITAL BUDGETING IN AGRICULTURE (1). Overview of capital budgeting techniques as applied to agribusiness decisions. Specific topics include methods of controlling land, leasing versus buying nonland capital assets. **PREREQS:** AREC 211 and AREC 300 and BA 340

AREC 468. M/CROP ENTERPRISE BUDGETING (1). Develop and calculate the per acre costs and returns of producing a crop enterprise. Includes the costs of owning and operating farm machinery. Distinguish between accountants' and economists' definitions of production costs. **PREREQS:** AREC 211

AREC 469. M/LIVESTOCK ENTERPRISE BUDGETING (1). Develop and calculate the costs and returns of producing a livestock enterprise. Includes the costs of raising breeding animals, as well as owning and operating machinery and livestock facilities. Distinguish between accountants' and economists' definition of production costs. **PREREQS:** AREC 211

AREC 470. M/FARM BUDGETING AND PLANNING (1). The process of planning a farm. Developing long-run whole farm budgets, cash flow planning/budgeting, monitoring and control, and year end analysis. **PREREQS:** AREC 211 and BA 215

AREC 475. M/NEGOTIATION IN BUSINESS AND RESOURCE MANAGEMENT (1). Understanding the theory and processes of negotiation as it is practiced in a variety of settings. The course covers distributive and integrative bargaining, dealing with the complexities of multi-party and multi-issue negotiations, and ethical issues that arise in negotiations. **PREREQS:** Junior or senior standing.

AREC 476. M/AGRICULTURAL PERSONNEL MANAGEMENT (2). A primer on agricultural personnel management including such topics as economic principles related to agricultural labor/management relations, the hiring process, performance appraisal, wage/benefit compensation, promotion/termination, personnel management from the employer perspective, and personnel management from the employee perspective.

AREC 499. SPECIAL TOPICS (1-3). Various topics in agricultural and resource economics of special and current interest not covered in other courses. This course is repeatable for a maximum of 9 credits.

AREC 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

AREC 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

AREC 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

AREC 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

AREC 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

AREC 521. ECONOMICS OF RURAL POVERTY AND THE U.S. SOCIAL SAFETY NET (4). Examines the geography of poverty in the United States and the «social safety net» that the U.S. has constructed to reduce poverty and its negative effects. Understand the geographical consequences of federal policies and the challenges of providing social safety net programs in rural areas.

AREC 532. ENVIRONMENTAL LAW (4). Legal relationships arising out of rights to air, water, and land. The impact of federal and state regulation on pollution control and on the production, use, and disposal of hazardous materials. **PREREQS:** Graduate standing.

AREC 534. ENVIRONMENTAL AND RESOURCE ECONOMICS (3). Examines environmental and natural resource issues emphasizing the role of economics in understanding their causes, consequences, and potential solutions (e.g. air, water, fish, forests, climate change, biodiversity). Reviews welfare economics, market failures, externalities, property rights. Covers non-market valuation, innovative market and regulatory policies. **PREREQS:** AREC 311 or instructor permission.

AREC 543. INTERNATIONAL TRADE (4). Introduction to the major theories of international trade and to models that are useful for applied policy and regional analysis. Effects of trade and trade policy on consumers, workers, and firms are emphasized. Not offered every year. **PREREQS:** (AEC 513 and AEC 523)

AREC 544. COMMODITY FUTURES AND OPTIONS MARKETS (4). Provides an overview of the basic concepts needed to use commodity futures and options markets to successfully manage price risk. To address the increasingly global economy in which commodity transactions occur, the course also includes financial futures such as interest rates and currencies. Specific topics covered include contract standardization, speculation and hedging, opening and closing of positions, and basis, i.e. the relationship between cash and futures markets, input-output hedges, and spreads. Students also gain hands-on experience through a trading simulation.

AREC 550. ENVIRONMENTAL AND NATURAL RESOURCE ECONOMICS (4). Presents concepts, theories, and methods used in the economic analysis of environmental and natural resource issues. The emphasis is on the economics of environmental policies and the development of decision rules regarding the efficient use of natural resources. **PREREQS:** AEC 512

AREC 551. NATURAL RESOURCE ECONOMICS (3). Brief introduction to welfare economics with emphasis on defining economic efficiency, intertemporal efficiency, and other criteria for economic policy; property rights and natural resource use; sources of inefficient allocation of natural resources; benefit-cost analysis with full and limited information; exhaustible resources; renewable resources; conservation and preservation. Not offered every year. **PREREQS:** (AREC 512* or ECON 512*)

AREC 552. MARINE ECONOMICS (3). Economic aspects of marine resource utilization and management will be analyzed. Topics include open access aspect of marine resources; conflict and allocation of marine resources, marine resource markets, marine recreation, pollution, and aquaculture, with special emphasis on commercial fisheries. Offered every fall in odd years. **CROSSLISTED** as MRM 552 **PREREQS:** AREC 351 or AREC 352

AREC 554. RURAL DEVELOPMENT ECONOMICS AND POLICY (3). Theories of economic change in developed and less-developed economies; natural resource sectors and the development of rural regions, with emphasis on growth, diversification, and instability; resource mobility and the spatial aspects of development; poverty and inequality; rural development policy. Not offered every year. **PREREQS:** AREC 300 or AREC 311

AREC 556. ECONOMICS OF WATER CONSERVATION (1). Students will analyze water conservation by examining the relationship between economic and technological efficiency in water systems and management; and the

competition between water and energy needs. Offered in spring term even years. **PREREQS:** AREC 311 and AREC 313

AREC 560. CAPITAL INVESTMENT ANALYSIS USING AGTOOLS (3). Learn and understand the important factors in measuring the impacts of implementing technologies and/or conservation practices, adding value to products, or changing cropping systems or livestock enterprises. The AgTools TM software programs will be used to apply financial and economic principles to better understand and reduce the financial, production, marketing, and human resource risks facing agribusinesses.

AREC 562. THE ECONOMIC HISTORY OF AMERICAN AGRICULTURE (3). Focuses on the historical development of the agricultural industry in the United States from the time of settlement through recent times. The colonial years, expansion into Western territories, development of new technologies, and the eventual emergence of government as an important force in agriculture receive special attention. The relationship between agriculture and the remainder of the economy call attention to poverty, money and banking, pure food laws, and the reaction to the New Deal.

AREC 565. M/AGRICULTURAL FINANCIAL REPORTING AND ANALYSIS (3). Covers balance sheet, income statement, statement of cash flows, and statement of owner equity, using standards outlined by the Farm Financial Records Task Force. Also the use of ratios to evaluate financial performance. **PREREQS:** AREC 211 and AREC 300 and BA 215 and BA 340

AREC 567. M/CAPITAL BUDGETING IN AGRICULTURE (1). Overview of capital budgeting techniques as applied to agribusiness decisions. Specific topics include methods of controlling land, leasing versus buying nonland capital assets. **PREREQS:** AREC 211 and AREC 300 and BA 340

AREC 599. SPECIAL TOPICS (1-16). Various topics in agricultural and resource economics of special and current interest not covered in other courses. May be repeated for credit when topics differ. This course is repeatable for a maximum of 16 credits.

AREC 601. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

AREC 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

AREC 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

AREC 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

AREC 608. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

AREC 640. SUSTAINABLE DEVELOPMENT (3). Surveys research on the quantitative economic analysis of sustainable development, with an emphasis on integrated assessment methods and models and their application to agriculture and rural development policy, agricultural technology impact assessment, and climate change impact assessment.

AREC 643. TRADE AND DEVELOPMENT (4). Introduction to advanced topics in modern trade theory, including technology and trade, distributional effects of trade with emphasis on regional development, trade and the environment, and multilateral trade negotiations. Applications of the above theories to specific industries are emphasized. **PREREQS:** (AREC 543 and AEC 612* and AEC 625*)

AREC 651. ADVANCED NATURAL RESOURCE ECONOMICS (3). Dynamic allocation of scarce exhaustible and renewable natural resources, social versus private decisions; market and non-market considerations; technological change;

regulation; dynamics and uncertainty. Not offered every year. **PREREQS:** AREC 513 and AREC 526

AREC 652. ADVANCED ENVIRONMENTAL ECONOMICS (3). Interrelationships of natural resource use and the environment; applied welfare and benefit-cost analysis; externalities and pollution abatement; non-market valuation of resources; property rights; legal and social constraints; policy approaches. Not offered every year. **PREREQS:** ((AREC 513 or ECON 513) and (AREC 526 or ECON 526))

AREC 653. SPATIAL ECONOMICS OF NATURAL RESOURCES (3). Introduces the tools of spatial economics and demonstrates how those tools have been applied to various natural resources. Taught winter term every even year. **PREREQS:** AREC 651

AREC 699. SPECIAL TOPICS (1-16). Various topics in agricultural and resource economics of special and current interest not covered in other courses. This course is repeatable for a maximum of 16 credits.

■ RURAL STUDIES COURSES

RS 421. ECONOMICS OF RURAL POVERTY AND THE U.S. SOCIAL SAFETY NET (4). Examines the geography of poverty in the United States and the "social safety net" that the U.S. has constructed to reduce poverty and its negative effects. Understand the geographical consequences of federal policies and the challenges of providing social safety net programs in rural areas. **CROSSLISTED** as AREC 421.

RS 499. SPECIAL TOPICS (1-5). This course is repeatable for a maximum of 9 credits.

RS 502. INDEPENDENT STUDY (1-6). This course is repeatable for a maximum of 9 credits.

RS 512. INTRODUCTION TO RURAL STUDIES (2). Introduces students to the emerging theoretical perspectives, methodologies, and critical themes that define rural studies in the U.S. and elsewhere. It draws primarily from the disciplines of sociology, economics, anthropology, human development and geography, examining how each discipline understands and analyzes rural households and communities.

RS 513. CONTEMPORARY RURAL ISSUES (2). The focus will be on issues confronting rural Oregon. The class will also explore broader U.S. and international rural issues and examine commonalities and differences across cultures and development contexts. Weekly lecturers are drawn from the OSU community and beyond, including public policy makers, rural stakeholders, and nonprofit organizations.

RS 521. ECONOMICS OF RURAL POVERTY AND THE U.S. SOCIAL SAFETY NET (4). Examines the geography of poverty in the United States and the "social safety net" that the U.S. has constructed to reduce poverty and its negative effects. Understand the geographical consequences of federal policies and the challenges of providing social safety net programs in rural areas. **CROSSLISTED** as AREC 521.

RS 556. INT'L COMPARATIVE RURAL POLICY STUDIES SUMMER INSTITUTE (5). The International Comparative Rural Policy Studies (ICRPS) annual summer institute (held in locations around the world) is designed for graduate students and professionals to broaden their knowledge of rural policy. Working in groups, students study facets of rural policy, from policy formation to policy impacts, and explore similarities and differences between their countries and those of other participants.

RS 599. SPECIAL TOPICS (1-5). This course is repeatable for a maximum of 9 credits.

BOTANY AND PLANT PATHOLOGY

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FACULTY

Professors Arp, Behrenfeld, Ciuffetti, Coakley, Dolja, Ingham, Johnson, Liston, McCune, McEvoy, Muir, Mundt, Pscheidt, Smiley, Spatafora, Stone, Sugar, Tyler, Wolpert

Associate Professors Chang, Fowler, Milligan, Mockler, Ocamb, Parke, Rivin, Sayavedra-Soto

Assistant Professors Coop, Filichkin, Goyer, Hardison, Ivanchenko, Jaiswal, Jones, Luh, Santamaria, Stockwell, Westbury

Senior Instructors Halse, Putnam

COURTESY FACULTY

Professors Carrington, Loper, Martin, Neilson, Pfender, Rothwell, Stockey, Watrud

Associate Professors Gent, Grunwald, Hansen, Kentula, Mahaffee, Pyke

Assistant Professors Cronn, Grevstad, Kaye, Meinke, Reichman, Weiland, Zasada

ADJUNCT FACULTY

Associate Professor Freitag

Undergraduate Major

Botany (BS, CRED, HBS)

Options

Botanical Research

Fungal Biology

Plant Ecology and Systematics

Plant Molecular Genetics and Biotechnology

Pre-Professional Teaching

Minor

Botany

Graduate Majors

Applied Systematics in Botany (PSM)

Botany and Plant Pathology (MA, MAg, MAIS, MS, PhD)

Graduate Areas of Concentration

Applied Systematics

Ecology

Genetics

Genomics and Computational Biology

Molecular and Cellular Biology

Mycology

Plant Pathology

Plant Physiology

Systematics

Graduate Minor

Botany and Plant Pathology

UNDERGRADUATE STUDIES

Botany and plant pathology are concerned with the study of plants at all levels of biological organization, from molecular and cellular processes to the global ecosystem. This breadth of field reflects the wide range of issues and problems that confront plant biologists. In addition to addressing fundamental questions in plant biology, plant scientists in the 21st century will be called upon to provide information useful for producing food, fiber, and medicine for an increasing population, and for increasing our understanding of the diversity of plant and ecological systems and their interactions with humans. Students studying botany and plant pathology at OSU receive the basic science background necessary for such contributions, and may choose to focus in a particular area within plant science.

The undergraduate program in the Department of Botany and Plant Pathology is designed for students who wish to receive a BS in Botany degree and for students pursuing degrees in other fields that require a knowledge of plant biology. For example, students who have an undergraduate major in biology or environmental sciences may wish to emphasize botany courses in their upper-division course work.

Completion of the undergraduate curriculum in botany can qualify students for graduate work in various areas of plant biology and plant pathology, and for positions in state and federal agencies, and industries concerned with plants and their products.

Prospective botany majors should obtain a strong background in the biological and physical sciences at the high school level. Specifically recommended are a minimum of three years of high school mathematics, including algebra, geometry, and some exposure to trigonometry, one year of chemistry, one year of biology, one year of physics, and courses designed to develop computer and writing skills. Students without an adequate background in mathematics and science may make up these deficiencies early in their college careers.

GRADUATE STUDIES

The Department of Botany and Plant Pathology offers graduate programs in the following areas of concentration: applied systematics, ecology, genetics, genomics and computational biology, molecular and cellular biology, mycology, plant pathology, plant physiology, and systematics.

Students with majors in any one area may incorporate into their pro-

grams minors in other areas within the department or in other departments and colleges. Integrated minors, and interdisciplinary programs in plant physiology, molecular and cellular biology, genetics, and environmental sciences are also available.

The MS and PhD degrees offered by the Department of Botany and Plant Pathology require, in addition to course work, research resulting in presentation and defense of a thesis. A nonthesis MS degree also is available. PhD candidates must pass a written and oral preliminary examination upon completion of their course work. In addition, PhD students are required to be a teaching assistant for two quarters. The MA degree requires the knowledge of one foreign language.

Inquiries concerning graduate studies can be forwarded to the chairperson of the Department of Botany and Plant Pathology.

BOTANY (BS, CRED, HBS)

The required curriculum meets the course requirements of the university and the College of Agricultural Sciences and provides opportunity for specialized study in one or more principal areas of plant science. The undergraduate major, in regular consultation with a faculty advisor, prepares an academic program that meets university requirements, provides adequate scientific background, and fulfills individual goals and interests.

Required courses are listed below according to a suggested schedule. The order in which particular courses are taken may vary in individual cases.

All Botany undergraduate students are required to complete a focus area and its corresponding course work as part of the Botany undergraduate major. A student may choose more than one focus area; course work for focus areas should commence by the junior year. Course work delivered in these areas provide students with advanced knowledge and skills related to the study of plants and plant-like organisms in natural and managed ecosystems and in the laboratory.

Freshman Year

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

CH 121, CH 122, CH 123. *General Chemistry (5,5,5)

OR CH 231, CH 232, CH 233. *General Chemistry (4,4,4)

and CH 261, CH 262, CH 263.

*Laboratory for Chemistry 231, 232, 233 (1,1,1)

Select 8 credits of Mathematics from the list below:

MTH 111. *College Algebra (4)

MTH 112. *Elementary Functions (4)

MTH 231. Elements of Discrete Mathematics (4)

MTH 241. *Calculus for Management and Social Science (4)

MTH 245. *Mathematics for Management, Life, and Social Sciences (4)
 MTH 251. *Differential Calculus (4)
 MTH 252. Integral Calculus (4)
 WR 121. *English Composition (3)
 Approved Speech (COMM) course (3)
 Perspective courses (6)

Sophomore Year

BI 314. Cell and Molecular Biology (4)
 BOT 220. Introduction to Plant Biology (4)
 BOT 321. Plant Systematics (4)
 CH 331, CH 332. Organic Chemistry (4,4)
 HHS 231. *Lifetime Fitness for Health (2)
 HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)
 or any PAC Course (1–2)
 Additional approved writing (WR II) course (3)
 Perspectives courses (6)
 Additional electives (9–10)

Junior Year

BB 350. Elementary Biochemistry (4)
 or BB 450 and BB 451. General Biochemistry (4,3)
 BI 311. Genetics (4)
 or PBG 430. Plant Genetics (3)
 and PBG 431. Plant Genetics Recitation (1)
 BOT 313. Plant Structure (4)
 BOT 341. Plant Ecology (4)
 ST 351. Introduction to Statistical Methods (4)
 Perspectives courses (6)
 Synthesis courses (6)
 Additional electives including botany area of concentration credits (10–13)

Senior Year

BOT 331. Plant Physiology (4)
 BOT 332. Laboratory Techniques in Plant Biology (3)

Select one Non-Vascular Plant Course:

BOT 461. Mycology (5)
 or BOT 465. Lichenology (4)
 or BOT 466. Bryology (4)

Additional Quantitative Skills Courses (select a minimum of two courses):

CS 161. Introduction to Computer Science I (4)
 CS 162. Introduction to Computer Science II (4)
 PH 201. *General Physics (5)
 PH 265. Scientific Computing (3)
 ST 352. Introduction to Statistical Methods (4)
 ST 411. Methods of Data Analysis (4)
 Others by approval of advisor.

Select one Writing Intensive Course from below:

BB/BI 317. ^Scientific Theory and Practice (3)
 BI 371. ^Ecological Methods (3)
 BOT 323. ^Flowering Plants of the World (3)
 CSS 325. ^Ag and Environmental Predicaments: A Case Study Approach (4)
 HSTS 415. **Theory of Evolution and Foundation of Modern Biology (4)
 HSTS 419. **Studies in Scientific Controversy: Methods and Practices (4)

HSTS 425. ^History of the Life Sciences (4)
 MB 311. ^Molecular Microbiology Lab: A Writing Intensive Course (3)
 Additional upper-division biological science courses other than BOT courses (4)
 Perspectives courses (6)
 Additional electives (11–14)

Botany Focus Area Requirements

Ecology, Evolution and Conservation (12)

BI 445. Evolution (3)
 BOT 442. Plant Population Ecology (3)
 BOT 488. Environmental Physiology of Plants (3)
 FW 320. Introductory Population Dynamics (3)

Molecular, Cellular, and Genomic (13)

BI 445. Evolution (3)
 BB 451. General Biochemistry (3)
 BB 494. Biochemistry Laboratory (3)
 or BOT 480. Photosynthesis and Photobiology (3)
 BOT 475. Comparative Genomics (4)

Plant Pathology (14)

BOT 350. Introductory Plant Pathology (4)
 CSS 311. Introduction to Insect Pest Management (5)
 MB 302. General Microbiology (3)
 MB 303. General Microbiology Laboratory (2)

Total=180

Footnotes:

* Bacc Core Course
 ^ Writing Intensive Course (WIC)

OPTIONS

BOTANICAL RESEARCH OPTION

The Botanical Research option is designed for those undergraduate majors who desire to obtain the intensive research experience associated with the development of a thesis project.

This option requires the completion of a total of 21 credits selected from the following:

Two approved subject matter electives (6–10 credits)
 BOT 401. Research (9–12)
 BOT 403. Thesis (2–3)
 BOT 405. Reading and Conference (1–3)

To complete this option, students must follow the procedure outlined below:

- Choose a research advisor and develop the option.** Identify a research advisor from among the faculty in the Department of Botany and Plant Pathology who is willing to supervise the option. Develop a course list and overall plan for the option and have it approved by the research advisor and academic advisors.
- Develop expertise.** Complete two approved courses (6 credits minimum) in the area of the proposed research.
- Plan the research.** Develop a research proposal during one term of BOT 405, Reading and Conference (1–3 credits) (or HC 405, Reading

and Conference, for Honors College students), and have it approved by the research advisor.

- Perform the research.** Carry out the planned experimentation, receiving 9–12 credits for BOT 401, Research. (It is assumed that this credit and the associated research effort will ordinarily be distributed over several terms.)
- Report the research.**
 - Written form.** Write a document (thesis) describing the results of the research and have it approved by the research advisor and academic advisors. For this purpose, enroll in BOT 403, Thesis (2–3 credits).
 - Oral form.** Present the research results using an oral or poster presentation in a public forum approved by the research advisor and academic advisors. The presentation may be made to the department (e.g. at a BOT 407, Departmental Seminar) or at a scientific meeting for students or scientific society.

FUNGAL BIOLOGY OPTION

Required as part of the basic requirements for a botany major:

BOT 350. Introductory Plant Pathology (4)
 BOT 461. Mycology (5)

(Note: The above courses **do not** count toward the 21 credits required to complete the option.)

Select 2 to 7 credits of the following techniques courses:

BB 493. Biochemistry Laboratory (3)
 BB 494. Biochemistry Laboratory (3)
 MB 303. General Microbiology Lab (4)

Select 2 to 6 credits of the following professional experience electives:

BOT 401. Research (1–6)
 or BOT 410. Internship (1–6)
 BOT 405. Reading and Conference (1–2)
 or BOT 407. Seminar (1–2)

Select additional courses from below to bring total credits to 21:

BOT/FES 415. Forest Insect and Disease Management (5)
 BOT 465. Lichenology (4)
 BOT 590. Selected Topics in Mycology (3)
 FST 460. Brewing Science (3)
 FST/MB 479. Fermentation Microbiology (3)
 FS 499. Selected Topics in Forest Science: Mycorrhizal Ecology (1–3)
 MB 302. General Microbiology (3)
 MB 448. Microbial Ecology (3)

Total=21

PLANT ECOLOGY AND SYSTEMATICS OPTION

Select one of the following plant ecology courses:

BOT 440. Field Methods in Plant Ecology (4)
 BOT 442. Plant Population Ecology (3)

- BOT 488. Environmental Physiology of Plants (3)
 BOT 543. Plant Community Ecology (3)
 ENT 420. Insect Ecology (3)
Select one of the following plant systematics courses:
 BOT 323. ^Flowering Plants of the World (3)
 BOT 414. Agrostology (4)
 BOT 425. Flora of the Pacific Northwest (3)

Select additional courses from above or below to bring total to 21 credits:

Ecology Electives:

- BI 358. Symbioses and the Environment (3)
 BI 371. Ecological Methods (3)
 BOT 590. Selected Topics in Mycology: Fungal Symbioses (3)
 CH 390. Environmental Chemistry (3)
 CSS 305. Principles of Soil Science (4)
 [Taught at EOU La Grande campus only.]
 or SOIL 205. *Soil Science (4)
 FW 479. Wetlands and Riparian Ecology (3)
 MB 448. Microbial Ecology (3)
 RNG 352. Grassland and Shrubland Ecosystems (4)
 RNG 441. Rangeland Analysis (4)
 Z 351. Marine Ecology (3)

Systematics Electives:

- BI 445. Evolution (3)
 BOT 416. Aquatic Botany (4)
 BOT 461. Mycology (5)
 BOT 465. Lichenology (4)
 BOT 466. Bryology (4)
 BOT 590. Selected Topics in Mycology: Fungal Systematics (3)
 HORT/PBG 450. Plant Breeding (4)
 MCB 530. Introduction to Population Genetics (3)
 Z 427. Paleobiology (3)

Professional Experience Electives:

- BOT 401. Research (1–6)
 or BOT 410. Internship (1–6)
 BOT 405. Reading and Conference (1–2)
 or BOT 407. Seminar (1–2)

Total=21

PLANT MOLECULAR GENETICS AND BIOTECHNOLOGY OPTION

Required courses as part of the basic requirements for a botany major:

- BB 450, BB 451. General Biochemistry (4,3)
 BOT 350. Introductory Plant Pathology (4)
 (**Note:** The above courses **do not** count toward the **21 credits required** to complete the option.)

Required courses (10 credits):

- BI 460. Cell Biology (3)
 BI 461. Cell Biology Laboratory (2)
 MB 302. General Microbiology (3)
 MB 303. General Microbiology Laboratory (2)

Select one of the following molecular genetics courses (3–4 credits):

- CSS/HORT/PBG 450. Plant Breeding (4)
 MB 456. Microbial Genetics and Biotechnology (3)

Select one of the following technology courses (3–4 credits):

- BB 494. Biochemistry Laboratory (3)

- HORT/PBG 441. Plant Tissue Culture (4)
Select additional courses from above or below to bring total to 21 credits:

- BOT 401. Research (1–6)
 or BOT 410. Internship (1–6)
 BOT 405. Reading and Conference (1–2)
 or BOT 407. Seminar (1–2)

Total=21

PRE-PROFESSIONAL TEACHING BOTANY OPTION

The Pre-Professional Teaching option (24 to 26 credits), together with a BS in Botany, will complete the course requirements for admission to the Professional Teacher Education Licensure Program offered by the College of Education at Oregon State University. Prior to entering the initial licensure programs, students are also required to complete a series of tests specified by the licensure programs, including the basic skills test, multiple subject assessment tests, and approved subject matter tests for specific teaching endorsement areas. **Students electing to complete this option should note that admission to the licensure program is on a competitive basis. Completion of the option does not guarantee admission to the licensure program.**

In addition to completing all of the regular requirements for a BS in Botany, botany majors electing this option must:

1. Complete the following required pre-professional courses (12 credits).
 SED 409. Field Practicum: Science and Mathematics (3)
 SED 412/SED 512. Technology Foundations for Teaching Math and Science (3)
 SED 413/SED 513. Inquiry in Science and Science Education (3)
 and SED 501. Research: Scientific Inquiry (3 grad credits)
Note: SED 501 must be taken concurrently with SED 413/SED 513, but it must be reserved for graduate credit. Therefore, this course cannot be applied to an undergraduate degree.
Note: SED 51X courses are available in summer session as well as during the academic year.
2. Complete additional course work required or recommended for botany majors seeking licensure in one of the specific teaching endorsement areas indicated below (9–14).
Biology (Middle and High School option) (9)
 Z 331, Z 332, Z 333. Human Anatomy and Physiology (3,3,3)
 or Z 430. Principles of Physiology (4) and additional upper-division zoology courses (5)

Note: Blanket-numbered courses may not be used to meet this requirement.

Chemistry (Middle and High School option) (9–10)

- BB 450, BB 451. General Biochemistry (4,3)

Note: Elect BB 450 and BB 451 in completing requirements for a BS in Botany.

CH 337. Organic Chemistry Lab (4)
 One upper-division chemistry course in a field other than organic chemistry or biochemistry (3–4)

Note: These additional chemistry courses will qualify botany majors for a minor in chemistry.

Integrated Science (Middle and High School option) (12)

- GEO 201. *Earth System Science (4)
 GEO 202. *Physical Geology (4)
 GEO 203. *Evolution of Planet Earth (4)

Integrated Science (Elementary and Middle School option) (14)

- ATS 210. Introduction to the Atmospheric Sciences (3)
 GEO 201. *Earth System Science (4)
 GEO 202. *Physical Geology (4)
 OC 331. Intro to Oceanography (3)

3. Students electing this option are encouraged to participate in the undergraduate teaching assistant experiences available for reading and conference credit from the Department of Botany and Plant Pathology as BOT 405, Reading and Conference (1–16), or from the Biology Program as BI 405.
4. Students electing this option are encouraged to contact the College of Education for further advice and guidance, for information concerning other licensure areas of possible interest (e.g. physics and mathematics), and to obtain information concerning any recent changes in requirements for licensure.

UNDERGRADUATE MINORS

BOTANY MINOR

- BI 311. Genetics (4)
 or HORT/CSS/PBG 430. Plant Genetics (3)
 BOT 321. Plant Systematics (4)
 BOT 331. Plant Physiology (4)
 BOT 341. Plant Ecology (4)
 Additional upper-division BOT courses (11–12)
 [Excluding BOT 101 but may include BOT 401, BOT 405, BOT 407, BOT 410]

Total=27

The minor requirements listed above are subject to the following constraints: Courses required for a major and taken in the major department may not count toward a minor. An individual course may not count toward more than one minor. At least 12 credits of the minor must be upper division.

GRADUATE MAJORS

APPLIED SYSTEMATICS IN BOTANY (PSM)

Aaron Liston, *Director*
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Website: <http://psm.science.oregonstate.edu/>

The worlds of science and business are increasingly interconnected, creating strong demand for individuals who can bridge these two disciplines. Systematics is the science devoted to the discovery, description, and classification of the earth's biological diversity. The need for an accurate and comprehensive knowledge of biological diversity is now recognized by a broad array of interests in the public and private sectors. Plants and fungi are the focus of current initiatives in the conservation of endangered species, the restoration of native ecosystems, and the control of invasive weeds. Industry, private environmental consulting firms, and government agencies have an increasing need for individuals with expertise in plant identification and experience in survey techniques.

The Professional Science Master's (PSM) in Applied Systematics in Botany at OSU is the first program of its kind in the Pacific Northwest and was created with the help of professional affiliates employed in leadership roles in plant biology and conservation. The objective of this degree is to train students to be able to function effectively in a variety of work environments. Special training in business management, communications, and ethics complement core science curriculum, and students are required to complete an internship in lieu of thesis research.

The PSM program can usually be completed in two years, based on full-time study and at least 54 credit hours. Courses in plant and fungal diversity form the foundation of this program (BOT 516, BOT 561, BOT 514, BOT 565 or BOT 566, and BOT 525). Approved elective options (e.g. plant ecology, biological conservation, statistics) give students flexibility to create their program of study based on career interests. Professional courses are required in communication, research ethics, and business management (PSM 513, PSM 565, PSM 566, PSM 567, COMM 550 and PHL 547). These courses are designed to be taken in sequence during the first academic year. Students are required to complete a 3 to 6 month internship (6-12 credits) in lieu of thesis research (BOT 510).

For general information about PSM programs, contact the PSM Director, 2082 Cordley Hall, Corvallis OR 97331, 541-737-5259; email: kirstin.carroll@oregonstate.edu.

Degree Requirements (50 credits)

Core science courses (19)

Approved electives (7)

Professional courses (18)

Internship (6)

BOTANY AND PLANT PATHOLOGY (MA, MAg, MS, PhD, MAIS)

Graduate Areas of Concentration

Applied systematics, ecology, genetics, genomics and computational biology, molecular and cellular biology, mycology, plant pathology, plant physiology, systematics

The Department of Botany and Plant Pathology offers graduate programs leading to the Master of Arts, Master of Agriculture, Master of Science, and Doctor of Philosophy degrees in the field of botany and plant pathology.

Within this major field, students may elect to specialize in one of the approved areas of concentration.

The selection of an area of concentration is optional. Students may major in botany and plant pathology without selecting an area of concentration. The approved areas of concentration are described below.

- **Applied systematics** includes internship-based programs of study providing technical skills in plant classification, identification, and ecological properties of plant species.
- **Ecology** includes physiological, population, community, ecosystem and global studies in ecology.
- **Genetics** includes molecular, classical and population studies of the genetics of plants, fungi, and plant-associated microorganisms.
- **Genomics and computational biology** includes the functional, comparative and structural study of plant, fungal, viral and bacterial genomes and the development and application of bioinformatic algorithms and tools used in the analysis of genomic data.
- **Molecular and cellular biology** includes studies of molecular and cellular mechanisms active during plant development, molecular aspects of plant-pathogen interactions, and various aspects of gene regulation, signal transduction, and the cytoskeleton.
- **Mycology** includes the systematics, ecology, and population genetics of lichenized and nonlichenized fungi.
- **Plant pathology** includes studies in the areas of bacteriology, nematology, virology, forest pathology, epidemiology of plant diseases, the physiology of parasitism, and the molecular and biochemical basis of plant host-pathogen interactions.
- **Plant physiology** includes investigations of the regulation of plant growth and development, the molecular and physiological basis of

plant-microbe interactions, nitrogen metabolism and the nitrogen cycle, and problems in environmental and stress physiology in plant systems.

- **Systematics** includes investigations of the taxonomy, phylogeny, and biogeography of plants, fungi, and lichens.

Students majoring in any one area of concentration may incorporate into their programs minors in other areas within the department or minors in other departments and colleges. Integrated minors, and interdisciplinary programs in plant physiology, molecular and cellular biology, genetics, and environmental sciences are also available.

The MS and PhD degrees offered by the Department of Botany and Plant Pathology require, in addition to course work, research resulting in the presentation and defense of a thesis. A nonthesis MS degree also is available for students with particular career goals, including an internship-based MS program in the area of applied systematics. PhD candidates must pass a preliminary examination upon completion of their course work. In addition, PhD students are required to be a teaching assistant for two quarters. The MA degree requires the knowledge of one foreign language.

Inquiries concerning graduate studies may be forwarded to the chairperson of the Department of Botany and Plant Pathology.

BOTANY AND PLANT PATHOLOGY GRADUATE MINOR

Courses required for a Botany and Plant Pathology graduate minor are determined in consultation with the minor advisor.

COURSES

BOT 101. *BOTANY: A HUMAN CONCERN (4). Introductory botany for non-majors, emphasizing the role of plants in the environment, agriculture and society. Includes molecular approaches to the study of plant function and genetic engineering. Lec/lab. (Bacc Core Course)

BOT 220. INTRODUCTION TO PLANT BIOLOGY (4). Introduction to plant biology including an overview of major groups of plants, plant cells and cell types, plant anatomy and architecture, physiology and function, and ecology and the roles of plants in the environment. Laboratory exercises build on lecture themes and provide hands-on learning experiences including field trips. Lec/lab. **PREREQS:** BOT 101 or co-enrollment in BI 101 or BI 211 or one term of college-level biology.

BOT 313. PLANT STRUCTURE (4). The structural components of vascular plants and how plant structure relates to function, development, environment, evolution, and human use of plants. Field trip. Lec/lab. **PREREQS:** BI 213 or BI 213H

BOT 321. PLANT SYSTEMATICS (4). Vascular plant classification, diversity, and evolutionary relationships. Lab emphasizes the collection and identification of ferns, gymnosperms, and flowering plants in Oregon. Field trips. Lec/lab. **PREREQS:** BI 213 or BI 213H

BOT 322. ECONOMIC AND ETHNOBOTANY: ROLE OF PLANTS IN HUMAN CULTURE (3). Economic and cultural (ethnobotanical) uses of plants and fungi by humans, including domesticated cultivated plants as well as wild-growing plants, and uses of plants and fungi by indigenous cultures. Ecampus course only.

BOT 323. ^FLOWERING PLANTS OF THE WORLD (3). Global perspective of plant biodiversity with a focus on evolutionary origins, classification, and evolutionary relationships of the major groups of plants. Development and application of scientific writing and utilization of online information resources in plant evolutionary biology. (Writing Intensive Course) **PREREQS:** One year of college biology or departmental approval required.

BOT 331. PLANT PHYSIOLOGY (4). Survey of physiological processes in plants, including photosynthesis and plant metabolism, mineral nutrition and ion uptake processes, plant cell/water relations, regulation of plant growth and development, and transpiration and translocation. Lec/rec. **PREREQS:** (BI 213 or BI 213H) and ((CH 123 or (CH 233 and CH 263))

BOT 332. LABORATORY TECHNIQUES IN PLANT BIOLOGY (3). Laboratory experiences in the manipulation and observation of physiological processes in plant systems. Analysis and interpretation of physiological data generated in experimentation with plant systems. Training in basic laboratory skills, including the principles and procedures involved in the use of common items of laboratory instrumentation. Lab. **PREREQS:** BOT 331 or BI 314 or equivalent.

BOT 341. PLANT ECOLOGY (4). Study of higher plants in relation to their environment. The relationship of plant physiology and reproduction to environmental factors; competition and other species interactions; the structure, dynamics and analysis of vegetation. Field trips. Lec/lab. **PREREQS:** BI 213 or BI 213H. BOT 321 is recommended.

BOT 350. INTRODUCTORY PLANT PATHOLOGY (4). Symptoms, causal agents, diagnosis, and prevention of plant diseases, with emphasis on fungi, bacteria, nematode, and virus pathogens. Lec/lab. **PREREQS:** BI 213 or BI 213H

BOT 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

BOT 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

BOT 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

BOT 407. SEMINAR (1). Section 1: Departmental seminar. Section 2: Lichens and Bryophytes Research (1). Weekly one-hour meetings for reporting and discussion of active research projects, discussion of proposal research, review and discussion of recent literature, and mini-workshops on particular problems. Normally graded P/N. This course is repeatable for a maximum of 16 credits.

BOT 407H. SEMINAR (1). Section 1: Departmental seminar. Section 3: Lichens and Bryophytes Research (1). Weekly one-hour meetings for reporting and discussion of active research projects, discussion of proposal research, review and discussion of recent literature, and mini-workshops on particular problems. Normally graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

BOT 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

BOT 410. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor approval required.

BOT 414. AGROSTOLOGY (4). Classification and identification of grasses, with emphasis on the modern system of grass classification; laboratory practice in keying grass specimens to genus and species. Lec/lab. **PREREQS:** BOT 321

BOT 415. FOREST INSECT AND DISEASE MANAGEMENT (5). Effects of insects and diseases on forest ecosystems. Recognition of important groups, prediction of pest responses to environmental changes, and management strategies for protection of forest resources. Field trips. Lec/lab/rec. **PREREQS:** BI 213 or BI 213H

BOT 416. AQUATIC BOTANY (4). Taxonomy and ecology of aquatic vegetation, emphasizing freshwater and marine algae and the submergent vascular plants. Morphology, physiology, and classification of the algae; morphological and physiological adaptations of aquatic vascular plants; and primary production in aquatic ecosystems. Laboratory practice in the identification of local taxa. Field trips. Lec/lab. **PREREQS:** BI 213 or BI 213H

BOT 425. FLORA OF THE PACIFIC NORTHWEST (3). Vascular plant identification, terminology, and diagnostic characteristics of plant families. Lab emphasizes the use of keys for identification to the species level and ability to recognize by sight those plant families found in the Pacific Northwest. Field trips. Lec/lab. **PREREQS:** BOT 321 or equivalent.

BOT 435. POLLINATION BIOLOGY (4). Explores the special adaptations of flowering plants and insect pollinators. Lectures discuss the co-evolution of pollinators and flowering plants and specialized morphology of pollinators. Labs include the identification of pollinators, field surveys and an exercise that will create a management/restoration plan. Lec/lab. **PREREQS:** BOT 321 or equivalent or instructor consent.

BOT 440. FIELD METHODS IN PLANT ECOLOGY (4). Concepts and tools for describing, monitoring, and experimenting on vegetation. Combines Web-based material, field experience at the student's location, and student projects. **PREREQS:** Course in ecology and a course in statistics.

BOT 442. PLANT POPULATION ECOLOGY (3). Ecological aspects of plant form and reproduction; demography and population modeling; species interactions, including competition, mutualism, and herbivory. Lec/lab. **PREREQS:** BOT 341 or equivalent.

BOT 461. MYCOLOGY (5). A broad taxonomic survey of the fungi. Topics include life histories, systematics, ecology, genetics, and ethnomycology. Participation on field trips and the submission of a specimen collection are required. Lec/lab. **PREREQS:** (BI 211 or BI 211H) and (BI 212 or BI 212H) and (BI 213 or BI 213H)

BOT 465. LICHENOLOGY (4). Biology of lichens; includes structure, life histories, classification, and ecology. Field trip fee. Lec/lab. Offered alternate years. **PREREQS:** (BI 213 or BI 213H) and two botany courses.

BOT 466. BRYOLOGY (4). Biology of bryophytes; includes structure, life histories, classification, and ecology. Field trip fee. Lec/lab. Offered alternate years. **PREREQS:** (BI 213 or BI 213H) and two botany courses.

BOT 475. COMPARATIVE GENOMICS (4). Principles of comparative genomics. Methods for genome assembly and annotation. Genomic approaches for the study of structural change, whole genome duplication, gene family evolution, gene networks, gene regulation and epigenetics. Lab topics include the analysis of next generation sequencing data and conducting comparative genomic analyses. Lec/lab. **PREREQS:** ((BI 311 or CSS 430) and BI 314) and students will require a basic working knowledge of cell and molecular biology and genetics.

BOT 476. INTRODUCTION TO COMPUTING IN THE LIFE SCIENCES (3). Introduction to management of large datasets (e.g., nucleic acids, protein), computer programming languages, application of basic mathematical functions, and assembly of computational pipelines pertinent to life sciences. **PREREQS:** Cell and molecular biology or genetics, or by approval of instructor. Familiarity with text editing software and unix/linux operating system is advantageous.

BOT 480. PHOTOSYNTHESIS AND PHOTOBIOLOGY (3). Explores the diverse use of light in biological systems, with particular emphasis on photosynthesis. Lectures will discuss the nature of light, light in the natural environment, light absorption in biological systems, use of light energy for photosynthesis, communication, defense, motility, and vision, as well as deleterious effects of light and its use for global monitoring satellite systems. **PREREQS:** One course in plant physiology, ecology, or the equivalent, or by permission of instructor.

BOT 488. ENVIRONMENTAL PHYSIOLOGY OF PLANTS (3). Introduces students to mechanisms of plant responses to environmental change caused by humans, including atmospheric, nutrient, water, and global climate factors. Concepts are built around principles of plant environment relations. Lec/lab. **PREREQS:** One course in plant physiology or one course in ecology.

BOT 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

BOT 499H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

BOT 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

BOT 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

BOT 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

BOT 507. SEMINAR (1-16). Section 1: Departmental seminar (F, W, S). Section 2: Communication in Ecology (F). Section 3: Community and Habitat Analyses (W). Section 4: Lichens and Bryophytes Research (S). Weekly one-hour meetings for reporting and discussions of proposal research, review and discussion of recent literature, and mini-workshops on particular problems. Graded P/N. This course is repeatable for a maximum of 16 credits.

BOT 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

BOT 510. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits.

BOT 514. AGROSTOLOGY (4). Classification and identification of grasses, with emphasis on the modern system of grass classification; laboratory practice in keying grass specimens to genus and species. Lec/lab. **PREREQS:** BOT 321

BOT 515. FOREST INSECT AND DISEASE MANAGEMENT (5). Effects of insects and diseases on forest ecosystems. Recognition of important groups, prediction of pest responses to environmental changes, and management strategies for protection of forest resources. Field trips. Lec/lab/rec. **CROSSLISTED** as FES 515. **PREREQS:** BI 213 or BI 213H

BOT 516. AQUATIC BOTANY (4). Taxonomy and ecology of aquatic vegetation, emphasizing freshwater and marine algae and the submergent vascular plants. Morphology, physiology, and classification of the algae; morphological and physiological adaptations of aquatic vascular plants; and primary production in aquatic ecosystems. Laboratory practice in the identification of local taxa. Field trips. Lec/lab. **PREREQS:** BI 213 or BI 213H

BOT 525. FLORA OF THE PACIFIC NORTHWEST (3). Vascular plant identification, terminology, and diagnostic characteristics of plant families. Lab emphasizes the use of keys for identification to the species level and ability to recognize by sight those plant families found in the Pacific Northwest. Field trips. Lec/lab. **PREREQS:** BOT 321 or equivalent.

BOT 535. POLLINATION BIOLOGY (4). Explores the special adaptations of flowering plants and insect pollinators. Lectures discuss the co-evolution of pollinators and flowering plants and specialized morphology of pollinators. Labs include the identification of pollinators, field surveys and an exercise that will create a management/restoration plan. Lec/lab. **PREREQS:** BOT 321 or equivalent or instructor consent.

BOT 540. FIELD METHODS IN PLANT ECOLOGY (4). Concepts and tools for describing, monitoring, and experimenting on vegetation. Combines Web-based material, field experience at the student's location, and student projects. **PREREQS:** Course in ecology and ST 511 or equivalent.

BOT 542. PLANT POPULATION ECOLOGY (3). Ecological aspects of plant form and reproduction; demography and population modeling; species interactions, including competition, mutualism, and herbivory. Lec/lab. **PREREQS:** BOT 341 or equivalent.

BOT 543. PLANT COMMUNITY ECOLOGY (3). The structure, diversity, and successional dynamics of terrestrial plant communities; methods of analysis. Lec/lab. **PREREQS:** BOT 341 or equivalent.

BOT 547. NUTRIENT CYCLING (3). Reviews and discusses ecosystem-level biogeochemical concepts for terrestrial and freshwater ecosystems, primarily by reading and discussing classic and current literature to determine the state-of-knowledge and uncertainties associated with it. Topics will include root nutrient uptake mechanisms, soil chemical and biochemical transformations in different soil and ecosystems, measuring soil solution and watershed fluxes, soil organic matter formation and structure, the meaning of sustainability, the concept of N saturation in terrestrial ecosystems, and the use of natural abundance and tracer isotopes in ecosystem biogeochemistry. While forest biogeochemical processes will be emphasized, desert, aquatic, wetland, and prairie ecosystems will also be explored. **CROSSLISTED** as FS 547 and SOIL 547. **PREREQS:** College-level chemistry and biology and one class in ecology (BI 370 or equivalent) and/or soils (e.g. SOIL 205).

BOT 550. PLANT PATHOLOGY (5). Causal agents of plant disease, diagnosis, pathogenesis, epidemiology, and disease management principles and strategies. Field trip. Lec/lab/rec. **PREREQS:** BI 213 or BI 213H

BOT 552. PLANT DISEASE MANAGEMENT (4). Analysis of host, pathogen, and environmental factors influencing the increase and spread of plant disease. Epidemiological theory will be used as a basis for developing and evaluating principles and concepts of plant disease management. Lec/lab/rec. Offered alternate years. **PREREQS:** BOT 350 or BOT 550

BOT 553. PLANT DISEASE DIAGNOSIS (3). Diagnosis of plant diseases and identification of causal agents. Laboratory practice in identification techniques. Observation of symptoms exhibited by diseased plants in greenhouse and field locations. Field trips. Lec/lab. Offered alternate years in summer term. **PREREQS:** BOT 350 or BOT 550

BOT 554. PLANT PATHOGENIC NEMATODES (2). Survey of nematodes that cause plant disease. Includes taxonomy, identification, life cycles, symptomology, interactions with other plant pathogens, and how nematodes cause plant disease. Lec/lab. Offered alternate years.

PREREQS: BOT 550 and 6 credits of upper-division biology.

BOT 555. PLANT VIROLOGY (3). Nature and properties; symptomology; transmission; inhibitors; purification; electron microscopy; serology; control. Offered alternate years. **PREREQS:** BOT 550 and 6 credits of upper-division biology.

BOT 556. PHYLOGENETICS (4). Explores the theory and practice of modern phylogenetic analysis. Emphasis placed on tree reconstruction algorithms, assessment of statistical support, and contemporary issues in phylogenetics. Lab will focus on the use of phylogenetic software and the analysis of molecular data sets. Lec/lab. **CROSSLISTED** as Z 556. **PREREQS:** ST 511

BOT 561. MYCOLOGY (5). A broad taxonomic survey of the fungi. Topics include life histories, systematics, ecology, genetics, and ethnomycology. Participation on field trips and the submission of a specimen collection are required. Lec/lab. **PREREQS:** (BI 211 or BI 211H) and (BI 212 or BI 212H) and (BI 213 or BI 213H)

BOT 565. LICHENOLOGY (4). Biology of lichens; includes structure, life histories, classification, and ecology. Field trip fee. Lec/lab. Offered alternate years. **PREREQS:** (BI 213 or BI 213H) and two botany courses.

BOT 566. BRYOLOGY (4). Biology of bryophytes; includes structure, life histories, classification, and ecology. Field trip fee. Lec/lab. Offered alternate years. **PREREQS:** (BI 213 or BI 213H) and two botany courses.

BOT 575. COMPARATIVE GENOMICS (4). Principles of comparative genomics. Methods for genome assembly and annotation. Genomic approaches for the study of structural change, whole genome duplication, gene family evolution, gene networks, gene regulation and epigenetics. Lab topics include the analysis of next generation sequencing data and conducting comparative genomic analyses. Lec/lab. **CROSSLISTED** as MCB 575. **PREREQS:** Students will require a basic working knowledge of cell and molecular biology and genetics. BI 314 and (BI 311 or CSS 430)

BOT 576. INTRODUCTION TO COMPUTING IN THE LIFE SCIENCES (3). Introduction to management of large datasets (e.g., nucleic acids, protein), computer programming languages, application of basic mathematical functions, and assembly of computational pipelines pertinent to life sciences. **CROSSLISTED** as MCB 576. **PREREQS:** Cell and molecular biology or genetics, or by approval of instructor. Familiarity with text editing software and unix/linux operating system is advantageous.

BOT 580. PHOTOSYNTHESIS AND PHOTOBIOLOGY (3). Explores the diverse use of light in biological systems, with particular emphasis on photosynthesis. Lectures will discuss the nature of light, light in the natural environment, light absorption in biological systems, use of light energy for photosynthesis, communication, defense, motility, and vision, as well as deleterious effects of light and its use for global monitoring satellite systems. **PREREQS:** One course in plant physiology, ecology, or the equivalent, or by permission of instructor.

BOT 588. ENVIRONMENTAL PHYSIOLOGY OF PLANTS (3). Introduces students to mechanisms of plant responses to environmental change caused by humans, including atmospheric, nutrient, water, and global climate factors. Concepts are built around principles of plant environment relations. Lec/lab. **PREREQS:** One course in plant physiology or one course in ecology.

BOT 590. SELECTED TOPICS IN MYCOLOGY (1-3). Advanced topics in mycology through analysis of current literature. Detailed study of an aspect of mycology beyond those covered in

regular classes. Seminar and discussion format. This course is repeatable for a maximum of 16 credits. **PREREQS:** BOT 461 or BOT 561

BOT 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

BOT 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

BOT 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

BOT 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

BOT 607. SEMINAR (1). Section 1. Departmental seminar This course is repeatable for a maximum of 16 credits.

BOT 608. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

BOT 616. FOREST PATHOLOGY (3). Advanced topics in forest pathology with an emphasis on field problems facing managers of forest resources. Field trips. Lec/lab. Offered alternate years. **PREREQS:** (BOT 415 or BOT 515) or BOT 550

BOT 651. MOLECULAR BASIS OF PLANT PATHOGENESIS (3). Analysis of current concepts in the physiology, biochemistry, and genetics of host-parasite interactions. Topics covered include specificity, recognition, penetration, toxin production, altered plant metabolism during disease, resistance mechanisms and regulatory aspects of gene expression during host-parasite interactions. Offered alternate years. **CROSSLISTED** as MCB 651. **PREREQS:** BOT 550

BOT 668. PLANT DISEASE DYNAMICS (4). Evaluation of processes affecting the dynamics of plant disease and pathogen populations through analysis of current literature. Students will be expected to conduct extensive reading and analysis of literature and to meet with the instructor for small group discussions. Offered alternate years. **PREREQS:** BOT 550 and ST 412

BOT 691. SELECTED TOPICS-PLANT ECOLOGY (1-3). Recent advances and developing problems in plant ecology, with critical evaluation of current literature. Topics vary from year to year. This course is repeatable for a maximum of 99 credits. **PREREQS:** Graduate-level ecology.

BOT 692. SELECTED TOPICS: PLANT PATHOLOGY (1-3). Selected topics concerning plant pathogens and plant disease processes, emphasizing current literature and theory. Topics vary from year to year. This course is repeatable for a maximum of 99 credits. **PREREQS:** BOT 550 or equivalent.

BOT 699. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

CROP AND SOIL SCIENCE**Russ Karow, Head**

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FACULTY

Professors Bottomley, Butler, Corp, Dragila, Hannaway, Hayes, Horneck, Karow, Kling (sr. research), Lajtha, Machado, Macnab, Mallory-Smith, Myrold, Noller, Rao, Reitz, Shock, Stephenson, Tuck, Young (emeritus, part time), Zemetra

Associate Professors Angima, Baham, Bohle, Chastain, Elias (sr. research), Felix, Flowers, Hulting, Kleber, Lutcher, Nonogaki, Parke (sr. research), Rondon, Roseberg, Ross, Schrupf (seed certification, retired, part time), Sullivan, Walenta, Wysocki

Assistant Professors N. Anderson, Cuesta-Marcos (sr. research), Dreves (sr. research), Leonard (sr. research), Pett-Ridge, Townsend (sr. research)

Senior Instructors Cassidy, Charlton, Fery, McMorran (seed certification)

Instructors Burr (seed certification), Japhet, Maley, Shafabakhsh (seed certification), S. Smith (seed certification), Zielinski (seed certification)

COURTESY FACULTY

Professors Brilman, Brown, Griffith, Haunold, Olszyk, Peterson

Associate Professors Henning, Mueller-Warrant, Riera-Lizaraz, Vales

Assistant Professors M. Johnson, M. Rogers, Weisbrod

PROFESSIONAL FACULTY

Curry, Garay, Lundeen

Undergraduate Major

Crop and Soil Science (BS, CRED, HBS)

Options

Agronomy
Plant Breeding and Genetics
Soil Science

Minors

Crop Science
Soil Science

Graduate Majors

Crop Science (MAG, MAIS, MS, PhD)

Graduate Areas of Concentration

Crop Breeding, Genetics and Cytogenetics (cereals, oilseeds, potatoes)
Forage and Pasture Management
Grain Crop Production
Post-Harvest Seed Technology

Seed Biology
Seed Crop Physiology
Seed Production
Weed Biology
Weed Management

Graduate Options

Entomology
Plant Breeding and Genetics

Soil Science (MAG, MAIS, MS, PhD)**Graduate Areas of Concentration**

Environmental Soil Science
Forest Soils
Nutrient Cycling
Soil Geochemistry
Soil Conservation and Land Use
Soil Fertility and Plant Nutrition
Soil Genesis and Classification
Soil Microbiology
Soil Physics

Affiliated Interdisciplinary**Graduate Major****Water Resources Science (MS, PhD)**

(See Graduate School)

Graduate Minors

Crop Science
Soil Science

The discipline of crop science provides the knowledge and understanding for technologies that contribute directly to improvements in production and quality of food, feed, fiber, seed, energy, and nutraceutical crops for the world. The art and science of plant improvement are key elements in efforts to feed, clothe and provide energy for the world's ever-growing population. Conventional and molecular tools assist in the development of new genetic strains of food and energy crops. Crop plants play an important role in the future of sustainable food and energy production.

The discipline of soil science provides the basic understanding of the physical, chemical, and biological properties of this important natural resource. Why is soil important? Soil is the fundamental substrate for life on terrestrial landscapes. Soil plays a vital role in sustaining human welfare and assuring future agricultural productivity and environmental stability. An understanding of global and local ecology depends on an awareness of the soil and its properties. Global information and mapping systems are essential tools for characterizing the landscape and its constituent soils.

Agronomists are crop and soil scientists who work to improve crops and agricultural productivity while effectively managing pests and weeds. Students in crop and soil science explore important contemporary issues faced by our society, including water quality and management, sustainability of different types of

crop production, organic crop production, erosion and sedimentation, growing crops for biofuel production, land use and reclamation, genetic modification of crop plants, and soil quality and sustainability. An array of careers are available.

CAREER OPPORTUNITIES

Careers for crop scientists are available in business, industry, farming, research, agricultural chemical industries, seed production, seed technology, communications, conservation, and education. Positions are available in agricultural experiment stations and extension services, state departments of agriculture, food processing companies, insurance agencies, lending institutions, and commercial firms, both domestic and international, dealing in the processing and sale of farm products, chemicals, and seed.

Careers for soil scientists are available in agriculture, forestry, education, state and federal resource agencies, private consulting, and research. Farms, ranches, and agricultural supply companies employ soil scientists as managers or field representatives. Soil scientists may become teachers of vocational agriculture or environmental education, or they may become county extension agents in agriculture or natural resources. The U.S. Department of Agriculture's Forest Service and Natural Resources Conservation Service often employ soil scientists, as do private consulting firms in environmental engineering and land use planning.

ACADEMIC ADVISING

Undergraduate curricula in crop and soil science are flexible enough to provide for the student's individual professional needs and interests and for a broad-based general education by allowing electives in other colleges throughout the university. Undergraduate advising is a vital part of the program, and the department is well known for excellence in advising. The department has a head advisor who meets with all students each term. Advisors and faculty provide curricular guidance and aid in professional extra-curricular activities, career decisions, and job placement.

SCHOLARSHIPS

The Department of Crop and Soil Science administers a number of scholarships available only to students majoring in the department. Over \$40,000 is given to students each year.

STUDENT CLUBS

The department supports a Crop Science Club that provides valuable co-curricular professional development, a collegiate Soil Judging Team that participates in both regional and national competitions, the OSU Organic Growers Club that provides hands-on experience in organic

production of vegetable crops, and the OSU Bug Zoo, a student club whose members are actively engaged in insect education outreach to local schools and communities. Graduate students in soil science also have a student club.

CROP AND SOIL SCIENCE (BS, CRED, HBS)

The Bachelor of Science degree in Crop and Soil Science requires the choice of one of four options:

1. Agronomy
2. Plant Breeding and Genetics
3. Soil Science

OPTIONS

AGRONOMY OPTION

Students in the Agronomy option will gain the knowledge and skills necessary to be active participants in producing food, feed, fiber, and energy crops for our world. Increased production of field crops—wheat, corn, rice, sorghum, soybeans, forages, cotton, etc.—will be essential to meet the basic needs of the world's ever-growing population and such production will need to be accomplished in a world of diminishing soil, water, mineral, and petrochemical resources. As an agronomic professional you will have the knowledge and skill to access the potentials of a given production system and to choose plant materials and plant production practices that will optimize production while minimizing environmental impact. Maximum sustainable production will be your goal and you will need in-depth knowledge of plants, plant genetics, plant pests, soils, soil fertility, production equipment, economics, and politics to achieve this goal. Agronomists work for field crop production companies, as managers of small to large farms and ranches, and as managers of their own farming operations. Many work for federal, state, or local government agencies as educators, researchers, or field technicians. Others hold teaching, research, or extension positions in universities. Some work for private research laboratories, environmental service companies, insurance companies, or land appraisal firms.

Major Core

General Science Core

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

Choose one of the following chemistry series:

CH 121. General Chemistry (5) **and**
CH 122, CH 123. *General Chemistry (5,5)

OR:

CH 231, CH 232, CH 233. *General Chemistry (4,4,4)

and CH 261, CH 262, CH 263.

*Laboratory for Chemistry 231, 232, 233 (1,1,1)

MTH 112. *Elementary Functions (4)

or MTH 241. *Calculus for Management and Social Science (4)

or MTH 245. *Calculus for Management, Life, and Social Sciences (4)

Orientation

CROP 101. Introduction to Horticulture, Crop, Soil, and Insect Science (1)

Agricultural Science

BOT 331. Plant Physiology (4)

BOT 350. Introductory Plant Pathology (4)

CROP 440. Weed Management (4)

ENT 311. Introduction to Insect Pest Management (4)

SOIL 205. *Soil Science (4)

Experiential Learning

CROP 401, CROP 403 or CROP 410.

Research/Thesis/Internship (3 or more credits)

CROP 407. Seminar (1)

Ecology

Select 1 of the following courses:

BI 370. Ecology (3)

BOT 341. Plant Ecology (4)

FES 341. Forest Ecology (3)

HORT 318. ^Applied Ecology of Managed Ecosystems (3)

RNG 341. Rangeland Ecology and Management (3)

Technology

HORT 414. Information Systems in Agriculture (4)

Writing Intensive Course (WIC)

CROP/SOIL 325. ^Ag and Environmental Predicaments: A Case Study Approach (3)

Capstone

CROP/HORT 480. Case Studies in Cropping Systems Management (4)

Option Requirements

Agronomy Core

CROP 200. Crop Ecology and Morphology (3)

CROP 300. Crop Production in Pacific Northwest Agroecosystems (4)

CROP 310. Forage Production (4)

CROP 319. Principles of Crop Production (3)

CROP 330. *World Food Crops (3)

CROP 460. Seed Production (3)

HORT 316. Plant Nutrition (4)

HORT 316. Plant Nutrition (4)

PBG 430. Plant Genetics (3)

SOIL 316. Nutrient Cycling in Agroecosystems (4)

ST 351. Introduction to Statistical Methods (4)

Agronomy Electives

Choose at least 6 credits from the following courses:

BEE 439. Irrigation Principles and Practices (4)

BOT 321. Plant Systematics (4)

BOT 414. Agrostology (4)

CROP 199. Special Studies: Issues in Sustainable Agriculture (1) (*repeatable*)

CROP 420. Seed Science and Technology (3)

Ecampus only

CSS 320. Principles of Oil and Fiber Crop Production (1)**EOU only**

CSS 321. Principles of Cereal Crop

Production (1)**EOU only**

CSS 322. Principles of Potato Production (1)
EOU only

CROP 418. Toxic Plants in PNW Pastures (1)
Ecampus only

FES 341. Forest Ecology (3)

FES 365. *Issues in Natural Resources Conservation (3)**Cascades & Ecampus only**

GEO 335. *Introduction to Water Science and Policy (3)

HORT 260. Organic Farming & Gardening (3)

HORT 433. Systematics and Adaptation of Vegetable Crops (4)

HORT 463. Seed Biology (3)

PBG 450. Plant Breeding (4)

RNG 341. Rangeland Ecology and Management (3)

SOIL 475. Soil Resource Potentials (4)

Business and Economics

AREC 211. Management in Agriculture (4)

AREC 221. Marketing in Agriculture (3)

AREC 250. *Introduction to Environmental Economics and Policy (3)

or ECON 201. *Introduction to Microeconomics (4)

Electives in Business

Choose a minimum of 4 credits from the following courses:

AREC 300. Applied Economic Analysis (3)

AREC 372. Agricultural Cooperatives (2)

AREC 388. Agricultural Law (4)

AREC 468. M/Crop Enterprise Budgeting (1)

AREC 470. M/Farm Budgeting and Planning (1)

AREC 476. M/Agricultural Personnel Management (2)

BA 463. Family Business Management (4)

Experiential Learning Track

(optional):

10 or more credits of a structured internship (CROP 410) can be substituted for the 6 credits of agronomy electives, and four credits of business electives. This would allow a student to use an entire term for internship work.

Research Track (optional):

Suggested classes, select courses most relevant to your intended graduate school program:

BB 350. Elementary Biochemistry (4)

BOT 321. Plant Systematics (4)

BOT 341. Plant Ecology (4)

BOT 414. Agrostology (4)

CH 331. Organic Chemistry (4)

CH 332. Organic Chemistry (4)

CH 337. Organic Chemistry Lab (4)

MB 230. *Introductory Microbiology (4)

MTH 251. *Differential Calculus (4)

PH 201. *General Physics (5)

WR 327. *Technical Writing (3)

Grade Requirements

Students pursuing the Agronomy option under the Crop and Soil Science major, are required to receive a grade of C or better in all CROP, CSS, ENT, HORT, PBG, and SOIL courses required within their major and option.

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

PLANT BREEDING AND GENETICS OPTION

The Plant Breeding and Genetics (PB&G) option at Oregon State University embodies the Land Grant mission of integrated research, teaching and extension in the context of cultivar development and fundamental genetics. Plant breeding is a collaborative discipline spanning everything from classical field approaches to gene manipulation at the molecular level. Breeders regularly cooperate with pathologists, entomologists, soil scientists, physiologists, food scientists, genomicists, molecular biologists and experts in other fields.

Students in the Plant Breeding and Genetics option will learn an interdisciplinary approach to applied plant breeding by taking courses across a broad spectrum of disciplines. The option may be tailored to meet students' career goals including graduate school, as well as directly entering public or private sector breeding programs. After completing their degree, students will have gained fundamental knowledge in plant breeding that may be applied in a range of crops including annual and perennial horticultural crops, agronomic food and feed crops, and forestry products.

Major Core**General Science**

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

Choose 1 of the following chemistry series:

CH 121. General Chemistry (5) **and** CH 122, CH 123. *General Chemistry (5,5)

OR:

CH 231, CH 232, CH 233. *General Chemistry (4,4,4) **and** CH 261, CH 262, CH 263. *Laboratory for Chemistry 231, 232, 233 (1,1,1)

MTH 112. *Elementary Functions (4) or MTH 241. *Calculus for Management and Social Science (4) or MTH 245. *Calculus for Management, Life, and Social Sciences (4)

Orientation

CROP/HORT 101. Introduction to Horticulture, Crop, Soil, and Insect Science (1)

Plant, Soil and Insect Science

BOT 331. Plant Physiology (4)
BOT 350. Introductory Plant Pathology (4)
CROP 440. Weed Management (4)
ENT 311. Introduction to Insect Pest Management (4)
SOIL 205. *Soil Science (4)

Experiential Learning

PBG 403. Thesis (3–12)
or PBG 410. Internship (3–12)
CROP/HORT 407. Seminar (1)

Ecology**Select 1 of the following courses:**

BI 370. Ecology (3)
BOT 341. Plant Ecology (4)
HORT 318. ^Applied Ecology of Managed Ecosystems (3)

Technology

PBG 441. Plant Tissue Culture (4)

Writing Intensive**Select 1 of the following courses:**

BOT 323. ^Flowering Plants of the World (3)
CROP/SOIL 325. ^Ag and Environmental Predicaments: A Case Study Approach (3)
HORT 318. ^Applied Ecology of Managed Ecosystems (3)

Capstone

PBG 450. Plant Breeding (4)

Option Requirements**Horticultural Science**

HORT 301. The Biology of Horticulture (3)
HORT 311. Plant Propagation (4)
HORT 316. Plant Nutrition (4)
HORT 411. Horticulture Book Club (1)
HORT 412. Career Exploration: Internships and Research Projects (1)

Plant Materials**Select 2 of the following courses:**

BOT 313. Plant Structure (4)
BOT 321. Plant Systematics (4)
BOT 425. Flora of the Pacific Northwest (3)
CROP 200. Crop Ecology and Morphology (3)
FES 141. Tree and Shrub Identification (3)
HORT 226. Landscape Plant Materials I: Deciduous Hardwoods and Conifers (4)
HORT 228. Landscape Plant Materials II: Spring Flowering Trees and Shrubs (4)
HORT 251. Temperate Tree Fruits, Berries, Grapes, and Nuts (2)
HORT 255. Herbaceous Ornamental Plant Materials (3) **Ecampus only**
HORT 433. Systematics and Adaptations of Vegetable Crops (4)

Science and Technology

HORT 463. Seed Biology (3)
PBG 430. Plant Genetics (3)
ST 351. Introduction to Statistical Methods (4)

Production and Technology**Select 4 of the following courses for 12 credits minimum:**

BOT 332. Laboratory Techniques in Plant Biology (3)
CROP 199. Special Studies: Issues in Sustainable Agriculture (1)
CROP/HORT 300. Crop Production in Pacific Northwest Agroecosystems (4)
CROP 310. Forage Production (4)
CROP 330. *World Food Crops (3)
CROP 460. Seed Production (3)
CROP 590. Experimental Design in Agriculture (4)
CSS 320. Principles of Oil and Fiber Crop Production (1) **Offered at EOÜ only.**
CSS 321. Principles of Cereal Crop Production (1) **Offered at EOÜ only.**
CSS 322. Principles of Potato Production (1) **Offered at EOÜ only.**
HORT 260. Organic Farming and Gardening (3)
HORT 351. Floriculture and Greenhouse Systems (4)
HORT 361. Plant Nursery Systems (4)
HORT 452. Berry and Grape Physiology and Culture (4)
HORT 453. Grapevine Growth and Physiology (3)

HORT 454. Principles and Practices of Vineyard Production (3)

MB 302. General Microbiology (3)

MB 303. General Microbiology Lab (2)

PBG 513. Plant Genetic Engineering (3)

SOIL 316. Nutrient Cycling in Agroecosystems (4)

Plant Synthesis

CROP/HORT 480. Case Studies in Cropping Systems Management (4)

Ecology and Sustainability Ecosystems Courses

Meets Synthesis Requirements. Each course must be from a different department.

Contemporary Global Issues (Select 1 of the following courses):

AREC 351. *Natural Resource Economics and Policy (3)
AREC 461. ^Agricultural and Food Policy Issues (4)
BI 301. *Human Impacts on Ecosystems (3)
BI 306. *^Environmental Ecology (3)
BI 349. *Biodiversity: Causes, Consequences and Conservation (3)
CROP 330. *World Food Crops (3)
FES 365. *Issues in Natural Resources Conservation (3)
FW 325. *Global Crises in Resource Ecology (3)
GEO 300. *Sustainability for the Common Good (3)
GEO 330. *^Geography of International Development and Globalization (3)

Science, Technology and Society (Select 1 of the following courses):

ANS 315. *Contentious Social Issues in Animal Agriculture (3)
AREC 352. *Environmental Economics and Policy (3)
BI/FES 435. *Genes and Chemicals in Agriculture: Value and Risk (3)
CH 374. *Technology, Energy, and Risk (3)
CSS 395. *World Soil Resources (3) **Offered at EOÜ only.**
or SOIL 395. *World Soil Resources (3) **Ecampus only**
ENGR 350. *Sustainable Engineering (3)
ENSC 479. *^Environmental Case Studies (3)
FST 421. *Food Law (3)
FW 485. *Consensus and Natural Resources (3)
GEO 300. *Sustainability for the Common Good (3)
GEO 335. *Introduction to Water Science and Policy (3)
HST 481. *Environmental History of the United States (4)
HSTS 421. *Technology and Change (4)
HSTS 470. *Ecology and History: Landscapes of the Columbia Basin (3)
NUTR 312. *Issues in Nutrition and Health (3)
PH 313. *Energy Alternatives (3)
PS 476. *Science and Politics (4)
RNG 477. *Agroforestry (3)
Z 348. *Human Ecology (3)

Upper-Division Units=60**Total Units=180****Research Track (optional)**

HORT 406. Projects: Data Presentations (1)
MTH 251. *Differential Calculus (4)

MTH 252. Integral Calculus (4)
ST 351. Introduction to Statistical Methods (4)

Select 3 of the following:

BB 350. Elementary Biochemistry (4)
BI 370. Ecology (3)
BOT 341. Plant Ecology (4)
CH 331 Organic Chemistry (4)
CH 332. Organic Chemistry (4)
CH 337. Organic Chemistry Lab (4)
MB 230. *Introductory Microbiology (4)
PH 201. *General Physics (5)
PH 202. *General Physics (5)

Grade Requirements

Students pursuing the Plant Breeding and Genetics option under the Horticulture major and Crop and Soil Science major are required to receive a grade of C- or better in all BOT, CROP, CSS, FOR, HORT, MB, PBG, SOIL and ST courses required within their major and option.

Footnotes:

* Baccalaureate Core Course
^ Writing Intensive Course (WIC)

SOIL SCIENCE OPTION

The study of soil as a science provides students with a basic understanding of the physical, chemical, and biological properties of this essential natural resource. Soil is the fundamental substrate for life in terrestrial systems. Our food, fiber, and renewable energy are dependent on soils. Our understanding of soils is critical in the successful siting of buildings and construction of roadways and other transportation infrastructure. Our understanding of global and local ecology depends on an awareness of soil and its properties. Soils are the filters of our water and play active roles in storing carbon and other materials that are essential in human existence. As a soil science student you will explore issues including water quality and management, organic crop production, erosion and sedimentation, land-use and reclamation, and soil quality and sustainability. As a soil science professional you will be able to use your knowledge and skills to solve real world, sustainable living problems in urban, agricultural, forest, rangeland, and other natural systems. Many soil scientists work for the Natural Resource Conservation Service. Some work for other federal, state, or local government agencies as extension educators, researchers, or surveyors. Others hold teaching or research positions in colleges and universities. Soil scientists also work for fertilizer companies, private research laboratories, environmental service companies, insurance companies, and land appraisal firms.

Major Core

General Science Core

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

Choose 1 of the following chemistry series:

CH 121. General Chemistry (5) and CH 122, CH 123. *General Chemistry (5,5)

OR:

CH 231, CH 232, CH 233. *General Chemistry (4,4,4) and CH 261, CH 262, CH 263. *Laboratory for Chemistry 231, 232, 233 (1,1,1)

MTH 111. *College Algebra (4)

Orientation

SOIL 101. Introduction to Horticulture, Crop, Soil, and Insect Science (1)

Agricultural Sciences

ENT 311. Introduction to Insect Pest Management (4)

SOIL 205. *Soil Science (4)

Select 1 of the following courses:

BOT 331. Plant Physiology (4)
CROP 200. Crop Ecology and Morphology (3)

HORT 301. The Biology of Horticulture (3)

Select 1 of the following courses:

HORT 316. Plant Nutrition (4)
SOIL/CSS 316. Nutrient Cycling in Agroecosystems (4)

Experiential Learning

SOIL 401. Research (3)
or SOIL 403. Thesis (3)
or SOIL 410. Internship (3)
SOIL 407. Seminar (1)

Ecology

Select 1 of the following courses:

BI 370. Ecology (3)
BOT 341. Plant Ecology (4)
HORT 318. ^Applied Ecology of Managed Ecosystems (3)
RNG 341. Rangeland Ecology and Management (3)

Technology

SOIL 468. Soil Landscape Analysis (4)

Writing Intensive Course (WIC)

CROP/SOIL 325. ^Ag and Environmental Predicaments: A Case Study Approach (3)

Capstone

SOIL 475. Soil Resource Potentials (4)

Option Requirements

Soils Research Track

GEO 201. *Physical Geology (4)
or GEO 202. *Earth Systems Science (4)
or GEO 203. *Evolution of Planet Earth (4)
MTH 251. *Differential Calculus (4)
PH 201, PH 202. *General Physics (5,5)
SOIL 435. Environmental Soil Physics (3)
SOIL 445. Environmental Soil Chemistry (3)
SOIL 455. Biology of Soil Ecosystems (4)
SOIL 466. Soil Morphology and Classification (4)
ST 351. Introduction to Statistical Methods (4)

OR

General Soils Track

GEO 201. *Physical Geology (4)
or GEO 202. *Earth Systems Science (4)
or GEO 203. *Evolution of Planet Earth (4)
MTH 112. *Elementary Functions (4)
or MTH 241. *Calculus for Management and Social Science (4)
or MTH 245. *Calculus for Management, Life, and Social Sciences (4)

SOIL 466. Soil Morphology and Classification (4)

ST 351. Introduction to Statistical Methods (4)

Select 1 of the following courses:

SOIL 366. Ecosystems of Wildland Soils (3)
SOIL 435. Environmental Soil Physics (3)
SOIL 445. Environmental Soil Chemistry (3)
SOIL 455. Biology of Soil Ecosystems (4)

Soil Science Electives

Select a minimum of 12 credits from the following:

Nutrient Cycling

AREC 211. Management in Agriculture (4)
AREC 250. *Introduction to Environmental Economics and Policy (3)
BI/FES/TOX 435. *Genes and Chemicals in Agriculture: Value and Risk (3)
BOT 331. Plant Physiology (4)
BOT 547. Nutrient Cycling (3)
CH 130. General Chemistry of Living Systems (4)
CROP 199. Special Topics: Issues in Sustainable Agriculture (1)
FES 365. *Issues in Natural Resources Conservation (3)

HORT 316. Plant Nutrition (4)

RNG 341. Rangeland Ecology and Management (3)

SOIL 395. *World Soil Resources (3)

Ecampus only

SOIL 525. Mineral-Organic Matter Interactions (3)
TOX 430. Chemical Behavior in the Environment (3)

Soil Biology/Ecology

ATS 564. Interactions of Vegetation and Atmosphere (3)
BI 311. Genetics (4)
BI 314. Cell and Molecular Biology (4)
BI/FES/TOX 435. *Genes and Chemicals in Agriculture: Value and Risk (3)
BI 370. Ecology (3)
BOT 331. Plant Physiology (4)
BOT 332. Lab Techniques in Plant Biology (3)
BOT 341. Plant Ecology (3)
CH 331. Organic Chemistry (4)
CH 332. Organic Chemistry (4)
FES 341. Forest Ecology (3)
MB 302. General Microbiology (3)
MB 303. General Microbiology Lab (2)
MB 448. Microbial Ecology (3)
SOIL 366. Ecosystems of Wildland Soils (3)

Soil Hydrology

CE 412. Hydrology (4)
CE 413. GIS in Water Resources (3)
FE 430. Watershed Processes (4)
FE 434. Forest Watershed Management (4)
GEO 335. *Introduction to Water Science and Policy (3)
GEO 365. Introduction to Geographic Information Systems (4)
GEO 424. International Water Resources Management (3)
GEO 487. Hydrogeology (4)
MTH 251. *Differential Calculus (4)
MTH 252. Integral Calculus (4)
PH 202. *General Physics (5)

Spatial Analysis/Land Use

AREC 250. *Introduction to Environmental Economics and Policy (3)

FE 434. Forest Watershed Management (4)
 FES 141. Tree and Shrub Identification (3)
 FES 365. *Issues in Natural Resources Conservation (3)
 GEO 301. Map and Image Interpretation (4)
 GEO 335. *Introduction to Water Science and Policy (3)
 GEO 365. Introduction to Geographic Information Systems (4)
 GEO 423. Land Use in the American West (3)
 GEO 432. Applied Geomorphology (3)
 HORT 414. Information Systems in Agriculture (4)
 PH 201. *General Physics (5)
 PH 202. *General Physics (5)
 RNG 341. Rangeland Ecology and Management (3)
 SOIL 366. Ecosystems of Wildland Soils (3)

Sustainable Systems

AREC 250. *Introduction Environmental Economics and Policy (3)
 BI 301. *Human Impacts on Ecosystems (3)
 BI/Z 349. *Biodiversity: Causes, Consequences and Conservation (3)
 BOT 350. Introductory Plant Pathology (4)
 CROP 199. Special Topics: Issues in Sustainable Agriculture (1)
 CROP 300. Crop Production in Pacific Northwest Agroecosystems (4)
 CROP 330. *World Food Crops (3)
 CROP 440. Weed Management (4)
 CROP 460. Seed Production (3)
 CROP 480. Case Studies Cropping Systems Management (4)
 GEO 300. *Sustainability for the Common Good (3)
 HORT 260. Organic Farming and Gardening (3)
 SOIL 499. Special Topics (1)

Water/Watershed Management

AREC 250. *Introduction to Environmental Economics and Policy (3)
 AREC 351. *Natural Resource Economics and Policy (3)
 FE 430. Watershed Processes (4)
 FE 434. Forest Watershed Management (4)
 FES 365. *Issues Natural Resources Conservation (3)
 FW 326. Integrated Watershed Management (3)
 GEO 322. Surface Processes (4)
 GEO 335. *Introduction to Water Science and Policy (3)
 PS 475. Environmental Politics and Policy (4)
 RNG 355. Desert Watershed Management (3)
 RNG 455. Riparian Ecology and Management (3)
 SOIL 366. Ecosystems of Wildland Soils (3)

Footnotes:

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

UNDERGRADUATE MINORS

CROP SCIENCE MINOR

To earn the Crop Science minor, students must complete the courses listed below to total 27 credits.

Requirements

CROP 200. Crop Ecology and Morphology (3)
 CROP 300. Crop Production in Pacific Northwest Agroecosystems (4)

*SOIL 205. Soil Science (4)
 or CSS 305. Principles of Soil Science (4)
and CSS 306. Problem Solving: Soil Science Applications (1) [*CSS courses taught only at EOU LaGrande campus*]
Select a minimum of 15–16 credits from below:
 CROP 199. Special Studies: Issues in Sustainable Agriculture (1-16)
 CROP 310. Forage Production (4)
 CROP 319. Principles of Field Crop Production (3)
 CROP 330. *World Food Crops (3)
 CROP 407. Seminar (1)
 CROP 433. Systematics and Adaptation of Vegetable Crops (4)
 CROP 438. Exploring World Agriculture (2)
 CROP 440. Weed Management (4)
 CROP 460. Seed Production (3)
 CROP 463. Seed Biology (3)
 CROP/HORT 480. Case Studies in Cropping Systems Management (4)
 CROP 499. Special Topics in Crop Science and Soil Science (1–16)
 CSS 320. Principles of Oil and Fiber Crop Production (1) [**EOU LaGrande only**]
 CSS 321. Principles of Cereal Crop Production (1) [**EOU LaGrande only**]
 CSS 322. Principles of Potato Production (1) [**EOU LaGrande only**]
 ENT 311. Introduction to Insect Pest Management (4)
 PBG 430. Plant Genetics (3)
 PBG 450. Plant Breeding (4)
 SOIL 316. Nutrient Cycling in Agroecosystems (4)
 and other CROP or PBG or SOIL or ENT courses approved by the CSS Advisor

Total=27

Minimum Grade Requirement:

Students pursuing a minor in Crop Science are required to receive a grade of C or better in all CROP, CSS, ENT, HORT, PBG, and SOIL courses taken to complete the minor.

SOIL SCIENCE MINOR

To earn the Soil Science minor, students must complete the courses listed below to total 27 credits.

Soil Core

SOIL 205. *Soil Science (4)
 or CSS 305. Principles of Soil Science (4)
and CSS 306. Problem Solving: Soil Science Applications (1) [*CSS taught at EOU LaGrande campus only.*]
 CROP/SOIL 325. ^Agricultural and Environmental Predicaments: a Case Study Approach (3)
 and SOIL 316. Nutrient Cycling in Agroecosystems (4)
 and CSS 315. ^Nutrient Management and Cycling (4) [*Taught at EOU LaGrande campus only.*]

Biological and Physical Sciences

Select 4 credits of biological science upper-division elective(s) in BB, BI, BOT, ENT, FES 240, FES 241, MB or Z

Select 5 credits of physical science upper-division elective(s) in ATS, CH, GEO, GPH, OC, or PH

Soil Electives

Select a minimum of 9–11 credits from below:

BOT 547. Nutrient Cycling (3)
 CROP/SOIL 325. ^Agricultural and Environmental Predicaments: a Case Study Approach (3)
 SOIL 316. Nutrient Cycling in Agroecosystems (4)
 SOIL 366. Ecosystems of Wildland Soils (3)
 SOIL 395. *World Soil Resources (3)
 SOIL 435. Environmental Soil Physics (3)
 SOIL 445. Environmental Soil Chemistry (3)
 SOIL 455. Biology of Soil Ecosystems (4)
 SOIL 466. Soil Morphology and Classification (4)
 SOIL 468. Soil Landscape Analysis (4)
 SOIL 475. Soil Resource Potentials (4)
 SOIL 523. Principles of Stable Isotopes (3)
 SOIL 525. Mineral-Organic Matter Interactions (3)
 SOIL 536. Vadose Zone Hydrology Laboratory (1)
 or a CSS, CROP or SOIL course approved by the advisor.

Total=27

GRADUATE MAJORS

CROP SCIENCE (MAg, MS, PhD, MAIS)

Graduate Areas of Concentration

Crop breeding, genetics and cytogenetics (cereals, oilseeds, potatoes); forage and pasture management; grain crop production; post-harvest seed technology; seed biology; seed crop physiology; seed production; weed biology; weed management

Specific areas in crop science in which a student can prepare for his or her thesis include cereal breeding and genetics, grass breeding and genetics, forage and pasture management, seed production and technology, seed crop physiology, seed biology, post-harvest seed technology, and weed science.

Graduate Level Courses

in Crop Science

CROP 540. Weed Management (4)
 CROP 560. Seed Production (3)
 CROP 580. Case Studies in Cropping Systems Management (4)
 CROP 590. Experimental Design in Agriculture (4)
 CROP 670. Physiology of Crop Yield (3)
 PBG 550. Plant Breeding (4)
 PBG 620. DNA Fingerprinting (1)
 PBG 621. Genetic Mapping (1)
 PBG 622. Mapping Quantitative Trait Loci (1)
 PBG 650. Advanced Plant Breeding and Quantitative Genetics (3)
 PBG 660. Herbicide Science (4)

GRADUATE OPTIONS

ENTOMOLOGY GRADUATE OPTION

The Entomology (ENT) option at Oregon State University embodies the Land Grant mission of integrated research, teaching and extension in the context of understanding the basic biology of insects and with this knowledge then working with insects in natural and/or managed environments. Programs range from basic to applied and can include enhancement of environments to increase insect numbers to management of environments to diminish the numbers of insect pests. Entomologists regularly cooperate with plant scientists, physiologists, pathologists, soil scientists, genomics, molecular biologists and experts in other fields.

Students in the Entomology option will learn an interdisciplinary approach to entomology by taking courses across a broad spectrum of disciplines. The option may be tailored to meet students' career goals including further graduate education or directly entering public or private sector positions. After completing their degree, students will have gained fundamental knowledge in entomology that may be applied in a range of agricultural, forested, aquatic, or human environments.

Requirements

Select 12 credits from the following:

- ENT 507. Seminar (1-2)
- ENT/HORT 518. Current Topics in Entomology (2-4)
- ENT 520. Insect Ecology (3)
- ENT 542. Principles of Integrated Pest Management: Systems Design (4)
- ENT 599. Special Topics: *Explorations in OSU Entomology* (2-6)
- Z 540. Insect Physiology (3)

PLANT BREEDING AND GENETICS GRADUATE OPTION

The Plant Breeding and Genetics (PB&G) graduate option at Oregon State University embodies the Land Grant mission of integrated research, teaching and extension in the context of cultivar development and fundamental genetics. Plant breeding is a collaborative discipline spanning everything from classical field approaches to gene manipulation at the molecular level. Breeders regularly cooperate with pathologists, entomologists, soil scientists, physiologists, food scientists, genomics, molecular biologists and experts in other fields.

Students in the Plant Breeding and Genetics graduate option will learn an interdisciplinary approach to applied plant breeding by taking courses across a broad spectrum of disciplines. The option may be tailored to meet students' career goals including further graduate study, as well as direct entry into public

or private sector breeding programs. After completing the degree, students will have fundamental knowledge of plant breeding that may be applied to a range of crops including annual and perennial horticultural crops, agronomic food and feed crops, and forestry products.

Additional Requirements

Select 12 credits from the following list:

- BOT/MCB 575. Comparative Genomics (4)
- CROP 590. Experimental Design in Agriculture (4)
- PBG 507. Seminar (1-2)
- PBG/HORT 519. Current Topics in Plant Breeding and Genetics (2)
- PBG/HORT/CSS 530. Plant Genetics (3)
- PBG/HORT/MCB 541. Plant Tissue Culture (4)
- PBG/HORT/CSS 550. Plant Breeding (4)
- PBG/CSS/MCB 620. DNA Fingerprinting (1)
- PBG/CSS/MCB 621. Genetic Mapping (1)
- PBG/CSS/MCB 622. Mapping Quantitative Trait Loci (1)
- PBG 650. Advanced Plant Breeding and Quantitative Genetics (3)

SOIL SCIENCE (MAG, MS, PhD, MAIS)

Graduate Areas of Concentration

Environmental soil science, forest soils, nutrient cycling, soil geochemistry, soil conservation and land use, soil fertility and plant nutrition, soil genesis and classification, soil microbiology, soil physics

Faculty research specializations in soil science include ecosystem services, forest soils, management of soil nutrients, mineral-organic matter interactions, soil archaeology, soil biogeochemistry, soil microbial ecology, sustainable cropping systems, soil geomorphology, soil genesis, and soil hydrology. Amongst research institutions worldwide, Oregon State campus lands present the most soil diversity for study of associated problems.

Graduate Level Courses in Soil Science

- SOIL 513. Properties, Processes, and Functions of Soils (4)
- SOIL 523. Principles of Stable Isotopes (3)
- SOIL 525. Mineral-Organic Matter Interactions (3)
- SOIL 535. Soil Physics (3)
- SOIL 536. Vadose Zone Hydrology Laboratory (1)
- SOIL 545. Geochemistry of Soil Ecosystems (4)
- SOIL 555. Biology of Soil Ecosystems (4)
- SOIL 566. Soil Morphology and Classification (4)
- SOIL 568. Soil Landscape Analysis (4)
- SOIL 645. Soil Microbial Ecology (3)

GRADUATE MINORS

CROP SCIENCE GRADUATE MINOR

For more details, see the major professor. Approximately two-thirds (30 graduate

credits) of the 45-credit total required for a graduate degree should be listed in the major field and one-third (15 graduate credits) in the minor field. The student's advisory committee must include a member from the minor department.

SOIL SCIENCE GRADUATE MINOR

For more details, see the major professor.

Approximately two-thirds (30 graduate credits) of the 45-credit total required for a graduate degree should be listed in the major field and one-third (15 graduate credits) in the minor field. The student's advisory committee must include a member from the minor department.

■ CROP SCIENCE COURSES

CROP 101. INTRODUCTION TO HORTICULTURE, CROP, SOIL, AND INSECT SCIENCE (1). Introduces students with interests in horticulture, crop, soil, and insect sciences to educational and professional opportunities in these disciplines. Speakers will discuss opportunities in research and academia as well as in the applied professional job market. Open to all students. CROSSLISTED as ENT 101, HORT 101, SOIL 101.

CROP 199. SPECIAL STUDIES: ISSUES IN SUSTAINABLE AGRICULTURE (1-16). Invited speakers present seminars on specific aspects of agriculture relating to sustainability. Topics vary from term to term and year to year. May be repeated for credit when topics differ. This course is repeatable for a maximum of 16 credits.

CROP 199H. SPECIAL STUDIES: ISSUES IN SUSTAINABLE AGRICULTURE (1-16). Invited speakers present seminars on specific aspects of agriculture relating to sustainability. Topics vary from term to term and year to year. May be repeated for credit when topics differ. This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

CROP 200. CROP ECOLOGY AND MORPHOLOGY (3). An introduction to the concepts and principles of crop ecology and morphology and a foundation for other crop science courses. Examines the dynamics and function of crop communities, and the biotic and environmental interactions that influence productivity. Fundamentals of the developmental morphology of crop seeds, seedlings, and plants. Morphological features of seeds and plants in relation to the identification of crop families and species of economic importance.

CROP 300. CROP PRODUCTION IN PACIFIC NORTHWEST AGROECOSYSTEMS (4). Relation of crop production to human culture and the natural environment. Origins of agriculture and the processes of agricultural change, and productivity and sustainability of specific crop production systems in the Pacific Northwest. History, geography, resource requirements, and key challenges faced are presented. Fundamental crop production practices in relation to productivity and sustainability. Lec/lab/rec. CROSSLISTED as HORT 300 and CSS 300. **PREREQS:** One year of general biology or equivalent.

CROP 310. FORAGE PRODUCTION (4). Importance of, and current production practices for, forage crops. Lec/lab. **PREREQS:** (CSS 300 or CROP 300 or HORT 300) and (CSS 305 or CSS 205 or SOIL 205) or equivalent

CROP 319. PRINCIPLES OF FIELD CROP PRODUCTION (3). Provides students with an understanding of the basic principles of field crop production—tillage, soil testing, fertilization, variety selection, planting, and in-season crop management. Management practices for wheat, corn and soybean as «model» crops will be

discussed to assist students in preparing for a career in agriculture or the agricultural sciences. Offered odd years. **PREREQS:** CROP 300 or equivalent and SOIL 205

CROP 325. *AG AND ENVIRONMENTAL PREDICAMENTS: A CASE STUDY APPROACH (3). Evaluation of controversial agricultural and environmental problems. Production of clear oral and written documents describing and analyzing problems and specific courses of action utilizing team-building skills. (Writing Intensive Course) **CROSSLISTED** as SOIL 325. **PREREQS:** (CSS 305 or CSS 205 or SOIL 205)

CROP 330. *WORLD FOOD CROPS (3). Origin, production, utilization, and improvement of the world's major food crops. The role of crop production in global economic and social development; food security and worldwide nutritional requirements. (Bacc Core Course) **PREREQS:** CSS 200 or CROP 200 recommended.

CROP 340. *PENS AND PLOWS: WRITINGS OF WORKING THE LAND (3). A survey of literature from ancient Greece to the twentieth century focusing on the significance of agricultural life and/or the natural world. Students read and discuss writings considered critical in the development of Western culture and receive input on the literary significance and the accuracy of agriculture presented within the readings. (Bacc Core Course) Taught via Ecampus only.

CROP 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

CROP 403. THESIS (1-16). Independent, original study and preparation of a senior thesis. This course is repeatable for a maximum of 16 credits. **PREREQS:** Senior standing.

CROP 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

CROP 405H. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

CROP 407. SEMINAR (1). Senior seminar intended to instruct students on proper techniques for presentation of scientific material. Each student is expected to prepare and present a scientific seminar and to submit written documentation supporting that seminar.

CROP 410. INTERNSHIP (1-6). Professional work experience previously approved and supervised by the department, written report required. This course is repeatable for a maximum of 12 credits. **PREREQS:** Junior standing.

CROP 418. TOXIC PLANTS IN PNW PASTURES (1). Identifying and understanding ecology and biology of harmful weeds and poisonous plants found in Pacific Northwest pastures and rangelands and determining best management and control options. Taught via Ecampus only. **PREREQS:** College-level plant biology and/or taxonomy courses.

CROP 420. SEED SCIENCE AND TECHNOLOGY (3). Seed formation and factors affecting their development and maturation. Seed structure and chemical composition. Physiological and biochemical aspects of seed germination, dormancy, deterioration and storability. The concept of seed quality, its importance in agriculture, its attributes and impact on field performance. Methods of measuring seed quality of conventional and genetically modified seeds. Taught via Ecampus only. **PREREQS:** Biology, plant anatomy and/or physiology courses are recommended.

CROP 433. SYSTEMATICS AND ADAPTATION OF VEGETABLE CROPS (4). Covers the botanical and taxonomic relationships, breeding systems and adaptation of vegetable crops. Fresh material is used to illustrate varietal differences and traits of importance. Lec/lab. Offered even

years. **CROSSLISTED** as HORT 433/HORT 533. **PREREQS:** (BI 102 or BI 213 or BI 311 or HORT 430 or CSS 430 or PBG 430 or HORT 450 or CSS 450 or PBG 450)

CROP 438. EXPLORING WORLD AGRICULTURE (2). Survey of crop and livestock production in a designated section of the world, including history, culture, and political situation. Course is designed to prepare students for a tour of study area. **CROSSLISTED** as ANS 438, AREC 438, CSS 438, HORT 438. Graded P/N. This course is repeatable for a maximum of 8 credits.

CROP 440. WEED MANAGEMENT (4). Principles of weed control by cultural, biological, and chemical means; weed identification; introduction to herbicides and factors influencing their use. Lec/lab/rec. **PREREQS:** One year biological science and one course in organic chemistry.

CROP 460. SEED PRODUCTION (3). An introduction to principles and practices of seed-based genetic delivery systems. Fundamentals of seed crop biology, cultivar maintenance and production methods are stressed. Concepts are illustrated using Pacific Northwest seed crops. **PREREQS:** CROP 200 or CSS 200 or equivalent.

CROP 463. SEED BIOLOGY (3). Information about reproductive development of plants such as pollination and fertilization, which is important for the initiation of seed formation, will be provided. Embryo and endosperm development as well as accumulation of seed storage materials, which are major events during seed development, will be covered, as well as the dormancy and germination mechanisms in mature seeds. Lectures and discussions (presentations required for graduate students). Offered even years. **CROSSLISTED** as HORT 463/HORT 563. Lec/lab.

CROP 480. CASE STUDIES IN CROPPING SYSTEMS MANAGEMENT (4). Decision cases involving the production of field and horticultural crops; individual and group activities; discussion of the decision-making process. Multiple field trips required. A field trip fee will be charged. **CROSSLISTED** as HORT 480/HORT 580, CSS 480/CSS 580. **PREREQS:** CROP 300 or CSS 300 or HORT 300 and senior standing in agriculture.

CROP 499. SPECIAL TOPICS IN CROP SCIENCE AND SOIL SCIENCE (1-16). Technical knowledge and skills development courses offered in a wide array of course formats. Topics vary from term to term and year to year. May be repeated for credit when topics differ. This course is repeatable for a maximum of 16 credits.

CROP 499H. SPECIAL TOPICS IN CROP SCIENCE AND SOIL SCIENCE (1-16). Technical knowledge and skills development courses offered in a wide array of course formats. Topics vary from term to term and year to year. May be repeated for credit when topics differ. This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

CROP 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

CROP 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Masters-level graduate students.

CROP 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

CROP 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

CROP 507. SEMINAR (1). Graded P/N. This course is repeatable for a maximum of 99 credits.

CROP 509. PRACTICUM IN TEACHING (1-3). Developing skills and competence in teaching soil science under staff supervision; organization and presentation of instructional material by assisting in laboratory, recitation, and lectures. This course is repeatable for a maximum of 16 credits.

CROP 520. SEED SCIENCE AND TECHNOLOGY (3). Seed formation and factors affecting their development and maturation. Seed structure and chemical composition. Physiological and biochemical aspects of seed germination, dormancy, deterioration and storability. The concept of seed quality, its importance in agriculture, its attributes and impact on field performance. Methods of measuring seed quality of conventional and genetically modified seeds. Taught via Ecampus only. **PREREQS:** Biology, plant anatomy and/or physiology courses are recommended.

CROP 533. SYSTEMATICS AND ADAPTATION OF VEGETABLE CROPS (4). Covers the botanical and taxonomic relationships, breeding systems and adaptation of vegetable crops. Fresh material is used to illustrate varietal differences and traits of importance. Lec/lab. **CROSSLISTED** as HORT 433/HORT 533. **PREREQS:** BI 102 or BI 213 or BI 311 or HORT 430 or CSS 430 or PBG 430 or HORT 450 or CSS 450 or PBG 450

CROP 540. WEED MANAGEMENT (4). Principles of weed control by cultural, biological, and chemical means; weed identification; introduction to herbicides and factors influencing their use. Lec/lab/rec. **PREREQS:** One year biological science and one course in organic chemistry.

CROP 560. SEED PRODUCTION (3). An introduction to principles and practices of seed-based genetic delivery systems. Fundamentals of seed crop biology, cultivar maintenance and production methods are stressed. Concepts are illustrated using Pacific Northwest seed crops. **PREREQS:** CROP 200 or CSS 200 or equivalent.

CROP 563. SEED BIOLOGY (3). Information about reproductive development of plants such as pollination and fertilization, which is important for the initiation of seed formation, will be provided. Embryo and endosperm development as well as accumulation of seed storage materials, which are major events during seed development, will be covered, as well as the dormancy and germination mechanisms in mature seeds. Lectures and discussions (presentations required for graduate students). Offered even years. **CROSSLISTED** as HORT 463/HORT 563. Lec/lab.

CROP 580. CASE STUDIES IN CROPPING SYSTEMS MANAGEMENT (4). Decision cases involving the production of field and horticultural crops; individual and group activities; discussion of the decision-making process. Multiple field trips required. A field trip fee will be charged. **CROSSLISTED** as HORT 480/HORT 580, CSS 480/CSS 580. **PREREQS:** CROP 300 or CSS 300 or HORT 300 and senior standing in agriculture.

CROP 590. EXPERIMENTAL DESIGN IN AGRICULTURE (4). Field layout, analysis, and interpretation of basic experimental designs used in agronomy and plant breeding and including field plot techniques such as optimum plot size and shape, factorial arrangement, replication, sub-sampling, randomization, and blocking. Recitation provides practical experience with SAS. **PREREQS:** ST 351 or equivalent.

CROP 599. SPECIAL TOPICS IN CROP SCIENCE AND SOIL SCIENCE (1-16). Technical knowledge and skills development courses offered in a wide variety of course formats. Topics vary from term to term and year to year. May be repeated for credit when topics differ. This course is repeatable for a maximum of 16 credits.

CROP 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

CROP 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** PhD-level graduate students.

CROP 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

CROP 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

CROP 607. SEMINAR (1). Graded P/N. This course is repeatable for a maximum of 99 credits.

CROP 608. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

CROP 660. HERBICIDE SCIENCE (4). Absorption, movement, and mechanism of action in plants; behavior of herbicides in soil. Offered alternate years. **PREREQS:** BOT 331 and (CSS 440 or CSS 540 or CROP 440 or CROP 540)

CROP 670. PHYSIOLOGY OF CROP YIELD (3). Concepts of crop growth and production in relation to environmental and physiological factors and their interactions; current literature. **PREREQS:** BOT 331 or equivalent.

CROP 699. SPECIAL TOPICS IN CROP SCIENCE AND SOIL SCIENCE (1-16). This course is repeatable for a maximum of 16 credits.

■ CROP AND SOIL SCIENCE COURSES

CSS 199. SPECIAL STUDIES: ISSUES IN SUSTAINABLE AGRICULTURE (1-16). Invited speakers present seminars on specific aspects of agriculture relating to sustainability. Topics vary from term to term and year to year. May be repeated for credit when topics differ. Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 16 credits.

CSS 200. CROP ECOLOGY AND MORPHOLOGY (3). An introduction to the concepts and principles of crop ecology and morphology and a foundation for other crop science classes. Examines the dynamics and function of crop communities, and the biotic and environmental interactions that influence productivity. Fundamentals of the developmental morphology of crop seeds, seedlings, and plants. Morphological features of seeds and plants in relation to the identification of crop families and species of economic importance. Taught at EOU LaGrande campus only.

CSS 205. *SOIL SCIENCE (4). Introduction to the chemical, physical and biological nature of soils. Examines the functions of soil as a medium for plant growth, a recycling system for nutrients and wastes, a modifier of atmospheric chemistry, a habitat for soil organisms, a system for water purification, and an engineering medium. Field and laboratory projects provide an understanding of fundamental soil science principles and the impact of human activities on soil quality and sustainability. Lec/lab. Field trips required. (Bacc Core Course) Taught at EOU LaGrande campus only.

CSS 300. CROP PRODUCTION IN PACIFIC NORTHWEST AGROECOSYSTEMS (4). Relation of crop production to human culture and the natural environment. Origins of agriculture and the processes of agricultural change, and productivity and sustainability of specific crop production systems in the Pacific Northwest. History, geography, resource requirements, and key challenges faced are presented. Fundamental crop production practices in relation to productivity and sustainability. Lec/lab/rec. CROSSLISTED as HORT 300 and CROP 300. Taught at EOU LaGrande campus only. **PREREQS:** One year of general biology or equivalent.

CSS 305. PRINCIPLES OF SOIL SCIENCE (4). Origin, formation, classification, physical, chemical, and biological characteristics; ecosystem functions of soils; effects of soil management on agricultural and forest crop production. Field trips. Taught at EOU LaGrande campus only. **PREREQS:** Two quarters of college chemistry or equivalent. CSS 306 recitation is recommended.

CSS 306. PROBLEM SOLVING: SOIL SCIENCE APPLICATIONS (1). Problem solving for, and in-depth exploration of, Principles of Soil Science (CSS 305). Real-world problems requiring knowledge of soil physical, chemical, and biological properties. Taught at EOU LaGrande campus only. **COREQS:** CSS 305

CSS 310. FORAGE PRODUCTION (4). Importance of, and current production practices for, forage crops. Lec/lab. Taught at EOU LaGrande campus only. **PREREQS:** CSS 300 or equivalent and CSS 305

CSS 311. INTRODUCTION TO INSECT PEST MANAGEMENT (5). Recognition, biology and management of injurious and beneficial insects; insects and human welfare. Concurrent laboratory is designed to illustrate principles of insect pest management in agricultural cropping systems, including medical and veterinary entomology. Lec/lab. Taught at EOU LaGrande campus only. **PREREQS:** One year of college biology.

CSS 315. ^NUTRIENT MANAGEMENT AND CYCLING (4). Nutrient forms, transformations, and plant availability as influenced by chemical and biological reactions in soils; soil pH and management of acid and alkaline soils; characteristics and use of fertilizers, soil amendments and organic wastes. Labs include routine soil testing procedures, computer applications for soil fertility management, and field trips. Lec/lab. (Writing Intensive Course) Taught at EOU LaGrande campus only. **PREREQS:** CSS 305 and CH 122. Courses in computers are recommended.

CSS 316. NUTRIENT CYCLING IN AGROECOSYSTEMS (3). Nutrient forms, transformations, and cycling. Diagnosis and correction of nutrient deficiencies, pH and salinity. Impact of nutrient management practices on crop production, soil health, nutrient use efficiency, and environmental quality. Organic and inorganic fertilization. Taught at EOU LaGrande campus only. **PREREQS:** CH 121 and (CSS 205 or CSS 305)

CSS 320. PRINCIPLES OF OIL AND FIBER CROP PRODUCTION (1). An overview of production practices and characteristics of oil seed, essential oil, and fiber crops. Taught at EOU LaGrande campus only. **PREREQS:** CSS 300 or equivalent and CSS 305

CSS 321. PRINCIPLES OF CEREAL CROP PRODUCTION (1). An overview of the principles underlying small grain production practices in the Pacific Northwest. Taught at EOU LaGrande campus only. **PREREQS:** CSS 300 or equivalent and CSS 305

CSS 322. PRINCIPLES OF POTATO PRODUCTION (1). Principles and practices governing all aspects of potato production, storage and use. Taught at EOU LaGrande campus only. **PREREQS:** CSS 300 or equivalent and CSS 305

CSS 325. ^AG AND ENVIRONMENTAL PREDICAMENTS: A CASE STUDY APPROACH (3). Evaluation of controversial agricultural and environmental problems. Production of clear oral and written documents describing and analyzing problems and specific courses of action utilizing team-building skills. (Writing Intensive Course) Taught at EOU LaGrande campus only. **PREREQS:** CSS 305

CSS 330. *WORLD FOOD CROPS (3). Origin, production, utilization, and improvement of the world's major food crops. The role of crop production in global economic and social development; food security and worldwide nutritional requirements. (Bacc Core Course) Taught at EOU LaGrande campus only. **PREREQS:** CSS 200 recommended.

CSS 340. *PENS AND PLOWS: WRITINGS OF WORKING THE LAND (3). A survey of literature from ancient Greece to the twentieth century focusing on the significance of agricultural life and/or the natural world. Students read and discuss writings considered critical in the development of Western culture and receive input on the literary significance and the accuracy of agriculture presented within the readings. (Bacc Core Course) Taught at EOU LaGrande campus and Ecampus only.

CSS 375. SOIL RESOURCE POTENTIALS (3). Bridges the gap between introductory soil science

classes and advanced mapping/classification courses. Emphasis is on the application of basic theoretical knowledge to understand practical, real world situations. Lec/lab. Taught at EOU LaGrande campus only. **PREREQS:** CSS 305 and or equivalent.

CSS 381. *AGRICULTURE, POWER, DISCRIMINATION, AND SURVIVAL (3). Study and discussion of the effect of difference, power, and discrimination from an agricultural perspective with particular emphasis on how agriculture has shaped both earth's ecology and human culture by enabling an ever-increasing human population. (Bacc Core Course) Taught at EOU LaGrande campus only.

CSS 395. *WORLD SOIL RESOURCES (3). The properties, global distribution, and agricultural productivity of major world soil groups are described. Potentials for human-accelerated soil degradation are introduced for each soil group, and reasons for conflicting assessments of degradation are discussed. (Bacc Core Course) CROSSLISTED as SOIL 395. Taught only at EOU LaGrande and Ecampus. **PREREQS:** CH 121 and /or equivalent.

CSS 401. RESEARCH (1-16). Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 16 credits.

CSS 403. THESIS (1-16). Independent, original study and preparation of a senior thesis. Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 16 credits. **PREREQS:** Senior standing.

CSS 405. READING AND CONFERENCE (1-16). Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 16 credits.

CSS 407. SEMINAR (1). Senior seminar intended to instruct students on proper techniques for presentation of scientific material. Each student is expected to prepare and present a scientific seminar and to submit written documentation supporting that seminar. Graded P/N. Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 99 credits.

CSS 408. WORKSHOP (1-16). Evaluation and judging of soils in Oregon and other states; directed studies of soil morphology, soil survey, soil fertility, soil physics, soil chemistry, soil biology, and soil information systems. Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 16 credits.

CSS 410. INTERNSHIP (1-6). Professional work experience previously approved and supervised by the department, written report required. Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 12 credits. **PREREQS:** Junior standing.

CSS 415. SOIL FERTILITY MANAGEMENT (3). Management of plant nutrients in agronomic systems; diagnosis of nutrient availability and prediction of crop response to fertilizers; interactions between nutrient response and chemical, physical and biological properties of soils. Taught at EOU LaGrande campus only. **PREREQS:** CSS 315 and courses in statistics, chemistry and plant physiology.

CSS 418. TOXIC PLANTS IN PNW PASTURES (1). Identifying and understanding ecology and biology of harmful weeds and poisonous plants found in Pacific Northwest pastures and rangelands and determining best management and control options. Taught via Ecampus only. **PREREQS:** College-level plant biology and/or taxonomy courses.

CSS 420. SEED SCIENCE AND TECHNOLOGY (3). Seed formation and factors affecting their development and maturation. Seed structure and chemical composition. Physiological and biochemical aspects of seed germination, dormancy, deterioration and storability. The concept of seed quality, its importance in agriculture, its attributes and impact on field

performance. Methods of measuring seed quality of conventional and genetically modified seeds. Taught at EOU LaGrande campus and Ecampus only. **PREREQS:** Biology, plant anatomy and/or physiology courses are recommended.

CSS 430. PLANT GENETICS (3). Introduction to the principles of plant genetics with an emphasis on the structure and function of economically important plant genomes. **CROSSLISTED** as HORT 430/HORT 530 and PBG 430/PBG 530. Taught at EOU LaGrande campus only. **PREREQS:** One year of biology and chemistry.

CSS 431. PLANT GENETICS RECITATION (1). Review and demonstration of plant genetics principles. **CROSSLISTED** as HORT 431 and PBG 431. Taught at EOU LaGrande campus only.

CSS 438. EXPLORING WORLD AGRICULTURE (2). Survey of crop and livestock production in a designated section of the world, including history, culture, and political situation. Course is designed to prepare students for a tour of study area. **CROSSLISTED** as ANS 438, AREC 438, CROP 438, HORT 438. Graded P/N. Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 8 credits.

CSS 440. WEED MANAGEMENT (4). Principles of weed control by cultural, biological, and chemical means; weed identification; introduction to herbicides and factors influencing their use. Lec/lab/rec. Taught at EOU LaGrande campus only. **PREREQS:** One year biological science and one course in organic chemistry.

CSS 445. ENVIRONMENTAL SOIL CHEMISTRY (3). Structural chemistry of clay minerals and organic matter, cation and anion exchange, and soil solution equilibria of soils. Ion exchange, mineral-solution equilibria, and adsorption reactions of silicate clays, oxides, and organic matter are emphasized. Covers the sorption behavior of environmental contaminants and the weathering reactions that govern the transport of reactive solutes through soils. Taught at EOU LaGrande campus only.

CSS 450. PLANT BREEDING (4). An introduction to the genetic improvement of self-pollinated, cross-pollinated, and asexually propagated species and the genetic principles on which breeding methods are based. Examples are drawn from a wide range of crops, including cereal grains, grasses, fruits, nuts, and vegetables; guest lecturers discuss their breeding programs. Additional topics include crop evaluation, germplasm preservation, disease resistance, and biotechnology. Lec/lab. **CROSSLISTED** as HORT 450/HORT 550, PBG 450/PBG 550. Taught at EOU LaGrande campus only. **PREREQS:** BI 311 or (PBG 430 or CSS 430 or HORT 430)

CSS 455. BIOLOGY OF SOIL ECOSYSTEMS (4). A detailed study of the organisms that live in the soil and their activities in the soil ecosystems, soil as a habitat for organisms, taxonomy and biology of soil organisms, fundamentals of nutrient cycles, special topics in soil biology, review basis of soil microbial and ecological principles. Lec/lab/rec. Taught at EOU LaGrande campus only. **PREREQS:** CSS 305. Courses in chemistry, physics, and microbiology are recommended.

CSS 460. SEED PRODUCTION (3). An introduction to principles and practices of seed-based genetic delivery systems. Fundamentals of seed crop biology, cultivar maintenance and production methods are stressed. Concepts are illustrated using Pacific Northwest seed crops. Taught at EOU LaGrande campus only. **PREREQS:** CSS 200 or equivalent.

CSS 466. SOIL MORPHOLOGY AND CLASSIFICATION (4). Observation and description of soil properties in the field; writing soil profile descriptions; evaluating criteria that define features used to classify soils; using soil classification keys. Lec/lab. Taught at EOU LaGrande campus only. **PREREQS:** CSS 305

CSS 468. SOIL LANDSCAPE ANALYSIS (4). Principles of soil geomorphology, soil stratigraphy, and surficial processes as applied to understanding the soil system at landscape scales. Emphasis on field observations of soils, geomorphic surfaces, and environment. Field project entails design of soil survey map units, field mapping and GIS cartographic techniques. Lec/lab. Taught at EOU LaGrande campus only. **PREREQS:** CSS 466*

CSS 480. CASE STUDIES IN CROPPING SYSTEMS MANAGEMENT (4). Decision cases involving the production of field and horticultural crops; individual and group activities; discussion of the decision-making process. Multiple field trips required. A field trip fee will be charged. **CROSSLISTED** as CROP 480/CROP 580 and HORT 480/HORT 580. Taught at EOU LaGrande campus only. **PREREQS:** CROP 300 or CSS 300 or HORT 300 or and senior standing in agriculture.

CSS 499. SPECIAL TOPICS IN CROP SCIENCE AND SOIL SCIENCE (1-16). Technical knowledge and skills development courses offered in a wide array of course formats. Topics vary from term to term and year to year. May be repeated for credit when topics differ. Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 16 credits.

CSS 501. RESEARCH (1-16). Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 16 credits.

CSS 503. THESIS (1-16). Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 999 credits. **PREREQS:** Masters-level graduate students.

CSS 505. READING AND CONFERENCE (1-16). Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 16 credits.

CSS 506. PROJECTS (1-16). Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 16 credits.

CSS 507. SEMINAR (1). Graded P/N. Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 99 credits.

CSS 508. WORKSHOP (1-16). Evaluation and judging of soils in Oregon and other states; directed studies of soil morphology, soil survey, soil fertility, soil physics, soil chemistry, soil biology, and soil information systems. Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 16 credits.

CSS 509. PRACTICUM IN TEACHING (1-3). Developing skills and competence in teaching soil science under staff supervision; organization and presentation of instructional material by assisting in laboratory, recitation, and lectures. Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 16 credits.

CSS 513. PROPERTIES, PROCESSES, AND FUNCTIONS OF SOILS (4). Physical, chemical, biological, and landscape properties; processes of fluid retention and movement, weathering and cation exchange, decomposition and C-N dynamics, erosion and sedimentation; functions of hydrologic regulation, nutrient cycling, environmental protection, ecological habitat. Taught at EOU LaGrande campus only. **PREREQS:** CH 223 or CH 233 or CH 233H or equivalent

CSS 515. SOIL FERTILITY MANAGEMENT (3). Management of plant nutrients in agronomic systems; diagnosis of nutrient availability and prediction of crop response to fertilizers; interactions between nutrient response and chemical, physical and biological properties of soils. Taught at EOU LaGrande campus only. **PREREQS:** CSS 315 and courses in statistics, chemistry and plant physiology.

CSS 520. SEED SCIENCE AND TECHNOLOGY (3). Seed formation and factors affecting their development and maturation. Seed structure and chemical composition. Physiological and

biochemical aspects of seed germination, dormancy, deterioration and storability. The concept of seed quality, its importance in agriculture, its attributes and impact on field performance. Methods of measuring seed quality of conventional and genetically modified seeds. Taught at EOU LaGrande campus and Ecampus only. **PREREQS:** Biology, plant anatomy and/or physiology courses are recommended.

CSS 523. PRINCIPLES OF STABLE ISOTOPES (3). An introduction to the theory and use of stable isotopes. Applications of stable isotopes to soil science, plant physiology, hydrology, and ecosystem studies. Taught at EOU LaGrande campus only.

CSS 525. MINERAL-ORGANIC MATTER INTERACTIONS (3). Studies the fundamental properties of the mineral-organic interface and the mechanisms of interaction between mineral and organic soil properties. Taught at EOU LaGrande campus only. **PREREQS:** CSS 305 or equivalent.

CSS 530. PLANT GENETICS (3). Introduction to the principles of plant genetics with an emphasis on the structure and function of economically important plant genomes. **CROSSLISTED** as HORT 430/HORT 530 and PBG 430/PBG 530. Taught at EOU LaGrande campus only. **PREREQS:** One year of biology and chemistry.

CSS 535. SOIL PHYSICS (3). Theoretical elements of soil physical properties and processes related to agricultural, hydrological and environmental problems. Requires concurrent weekly laboratory: CSS 536. Taught at EOU LaGrande campus only. **PREREQS:** CSS 305. Recommended are MTH 241 and CH 123 and PH 201 or equivalent. **COREQS:** CSS 536

CSS 536. VADOSE ZONE HYDROLOGY LABORATORY (1). Experimental elements of soil physical properties and processes allowing practical experience in the measurement and analysis of soil physical processes related to agricultural, hydrological and environmental problems. Weekly laboratory. Taught at EOU LaGrande campus only. **PREREQS:** CH 123 and PH 201 or equivalent.

CSS 540. WEED MANAGEMENT (4). Principles of weed control by cultural, biological, and chemical means; weed identification; introduction to herbicides and factors influencing their use. Lec/lab/rec. Taught at EOU LaGrande campus only. **PREREQS:** One year biological science and one course in organic chemistry.

CSS 545. ENVIRONMENTAL SOIL CHEMISTRY (3). Structural chemistry of clay minerals and organic matter, cation and anion exchange, and soil solution equilibria of soils. Ion exchange, mineral-solution equilibria, and adsorption reactions of silicate clays, oxides, and organic matter are emphasized. Covers the sorption behavior of environmental contaminants and the weathering reactions that govern the transport of reactive solutes through soils. Taught at EOU LaGrande campus only.

CSS 550. PLANT BREEDING (4). An introduction to the genetic improvement of self-pollinated, cross-pollinated, and asexually propagated species and the genetic principles on which breeding methods are based. Examples are drawn from a wide range of crops, including cereal grains, grasses, fruits, nuts, and vegetables; guest lecturers discuss their breeding programs. Additional topics include crop evolution, germplasm preservation, disease resistance, and biotechnology. Lec/lab. **CROSSLISTED** as HORT 450/HORT 550, PBG 450/PBG 550. Taught at EOU LaGrande campus only. **PREREQS:** BI 311 or CSS 430 or CSS 530 or PBG 430 or PBG 530 or HORT 430 or HORT 530

CSS 555. BIOLOGY OF SOIL ECOSYSTEMS (4). A detailed study of the organisms that live in the soil and their activities in the soil ecosystems, soil as a habitat for organisms, taxonomy and biology of soil organisms, fundamentals of nutrient

cycles special topics in soil biology, review basis of soil microbial and ecological principles. Lec/lab/rec. Taught at EOU LaGrande campus only. **PREREQS:** CSS 305. Courses in chemistry, physics, and microbiology are recommended.

CSS 560. SEED PRODUCTION (3). An introduction to principles and practices of seed-based genetic delivery systems. Fundamentals of seed crop biology, cultivar maintenance and production methods are stressed. Concepts are illustrated using Pacific Northwest seed crops. Taught at EOU LaGrande campus only. **PREREQS:** CSS 200 or equivalent.

CSS 566. SOIL MORPHOLOGY AND CLASSIFICATION (4). Observation and description of soil properties in the field; writing soil profile descriptions; evaluating criteria that define features used to classify soils; using soil classification keys. Lec/lab. Taught at EOU LaGrande campus only. **PREREQS:** CSS 305

CSS 568. SOIL LANDSCAPE ANALYSIS (4). Principles of soil geomorphology, soil stratigraphy, and surficial processes as applied to understanding the soil system at landscape scales. Emphasis on field observations of soils, geomorphic surfaces, and environment. Field project entails design of soil survey map units, field mapping and GIS cartographic techniques. Lec/lab. Taught at EOU LaGrande campus only. **PREREQS:** CSS 566*

CSS 580. CASE STUDIES IN CROPPING SYSTEMS MANAGEMENT (4). Decision cases involving the production of field and horticultural crops; individual and group activities; discussion of the decision-making process. Multiple field trips required. A field trip fee will be charged. **CROSSLISTED** as CROP 480/CROP 580 and HORT 480/HORT 580. Taught at EOU LaGrande campus only. **PREREQS:** CROP 300 or CSS 300 or HORT 300 or and senior standing in agriculture.

CSS 590. EXPERIMENTAL DESIGN IN AGRICULTURE (4). Field layout, analysis, and interpretation of basic experimental designs used in agronomy and plant breeding and including field plot techniques such as optimum plot size and shape, factorial arrangement, replication, sub-sampling, randomization, and blocking. Recitation provides practical experience with SAS. Taught at EOU LaGrande campus only. **PREREQS:** ST 351 or equivalent.

CSS 599. SPECIAL TOPICS IN CROP SCIENCE AND SOIL SCIENCE (1-16). Technical knowledge and skills development courses offered in a wide array of course formats. Topics vary from term to term and year to year. May be repeated for credit when topics differ. Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 16 credits.

CSS 601. RESEARCH (1-16). Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 16 credits.

CSS 603. THESIS (1-16). Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 999 credits. **PREREQS:** PhD-level graduate students.

CSS 605. READING AND CONFERENCE (1-16). Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 16 credits.

CSS 606. PROJECTS (1-16). Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 16 credits.

CSS 607. SEMINAR (1). Graded P/N. Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 99 credits.

CSS 608. WORKSHOP (1-16). Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 16 credits.

CSS 620. DNA FINGERPRINTING (1). Principles and methods for producing and analyzing DNA fingerprints. Offered alternate years. **CROSSLISTED** as PBG 620 and MCB

620. Taught at EOU LaGrande campus only. **PREREQS:** BI 311 or CSS 430 or CSS 530 or PBG 430 or PBG 530 or HORT 430 or HORT 530 or equivalent.

CSS 621. GENETIC MAPPING (1). Principles and methods for constructing genetic maps comprised of molecular and other genetic markers. Offered alternate years. **CROSSLISTED** as MCB 621 and PBG 621. Taught at EOU LaGrande campus only. **PREREQS:** BI 311 or CSS 430 or CSS 530 or PBG 430 or PBG 530 or HORT 430 or HORT 530 or equivalent.

CSS 622. MAPPING QUANTITATIVE TRAIT LOCI (1). Principles and methods for mapping genes underlying phenotypically complex traits. Offered alternate years. **CROSSLISTED** as MCB 622 and PBG 622. Taught at EOU LaGrande campus only. **PREREQS:** CSS 590 or ST 513 or equivalent.

CSS 645. SOIL MICROBIAL ECOLOGY (3). An advanced treatment of current topics in soil microbiology, with an emphasis on the ecology of soil microorganisms. Topics include the size, composition, diversity, and activity of soil microbial communities, linkage of microbial community structure to ecosystem functions, and applications of molecular biology to soil microbiology. Taught even years in fall. Taught at EOU LaGrande campus only. **PREREQS:** Recommend CSS 455 or MB 448.

CSS 650. ADVANCED PLANT BREEDING AND QUANTITATIVE GENETICS (3). Pedigree, bulk, single-seed-descent, doubled haploid, backcross, testcross, mass, and half-sib, S-1~, and S-2~ family breeding methods; breeding hybrids and selecting sources of alleles for developing superior hybrids; the nature and consequences of genotype by environment interactions; marker-assisted backcross and inbred line breeding; quantitative trait locus mapping; random linear models; designing and analyzing cultivar, line, and family selection experiments. Offered alternate years. Taught at EOU LaGrande campus only. **PREREQS:** (CSS 430 or CSS 530) and (CSS 450 or CSS 550) and (ST 411 or ST 511) and (ST 412 or ST 512) and (ST 413 or ST 513)

CSS 670. PHYSIOLOGY OF CROP YIELD (3). Concepts of crop growth and production in relation to environmental and physiological factors and their interactions; current literature. Offered alternate years. Taught at EOU LaGrande campus only. **PREREQS:** BOT 331 or equivalent.

CSS 699. SPECIAL TOPICS (1-16). Taught at EOU LaGrande campus only. This course is repeatable for a maximum of 16 credits.

■ PLANT BREEDING AND GENETICS COURSES

PBG 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PBG 199H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

PBG 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PBG 299H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

PBG 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PBG 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

PBG 403. THESIS (1-16). This course is repeatable for a maximum of 99 credits.

PBG 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

PBG 405H. READING AND CONFERENCE (1-16). Offered via Ecampus only. This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

PBG 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

PBG 409. TEACHING PRACTICUM (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

PBG 410. INTERNSHIP (3-12). This course is repeatable for a maximum of 12 credits.

PBG 430. PLANT GENETICS (3). Introduction to the principles of plant genetics with an emphasis on the structure and function of economically important plant genomes. **CROSSLISTED** as HORT 430/HORT 530 and CSS 430/530. **PREREQS:** One year of biology and chemistry.

PBG 431. PLANT GENETICS RECITATION (1). Review and demonstration of plant genetics principles. **CROSSLISTED** as HORT 431 and CSS 431.

PBG 441. PLANT TISSUE CULTURE (4). Principles, methods, and applications of plant tissue culture. Laboratory is important part of course. Topics include callus culture, regeneration, somaclonal variation, micropropagation, anther culture, somatic hybridization, and transformation. Lec/lab. **CROSSLISTED** as HORT 441/HORT 541, MCB 541. **PREREQS:** (BI 311 and BOT 331) or HORT 430 or PBG 430 or CSS 430

PBG 450. PLANT BREEDING (4). An introduction to the genetic improvement of self-pollinated, cross-pollinated, and asexually propagated species and the genetic principles on which breeding methods are based. Examples are drawn from a wide range of crops, including cereal grains, grasses, fruits, nuts, and vegetables; guest lecturers discuss their breeding programs. Additional topics include crop evaluation, germplasm preservation, disease resistance, and biotechnology. **CROSSLISTED** as HORT 450/HORT 550, CSS 450/CSS 550. Lec/lab. **PREREQS:** BI 311 or (PBG 430 or CSS 430 or HORT 430)

PBG 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PBG 499H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

PBG 501. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

PBG 503. THESIS (1-16). Graded P/N. This course is repeatable for a maximum of 999 credits.

PBG 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

PBG 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

PBG 507. SEMINAR (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

PBG 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

PBG 509. TEACHING PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

PBG 510. INTERNSHIP (4). This course is repeatable for a maximum of 12 credits.

PBG 513. PLANT GENETIC ENGINEERING (3). Principles, methods, and recent developments in the genetic engineering of higher plants. Offered alternate years. **PREREQS:** (BI 311 and BOT 331) or (CSS 430 or CSS 530) or (HORT 430 or HORT 530) or (PBG 430 or PBG 530)

PBG 519. CURRENT TOPICS IN PLANT BREEDING AND GENETICS (2). Provides an advanced understanding of plant breeding and genetics and their relationship to other disciplines through critical analysis of the scientific literature. Students practice synthesizing information and presenting findings to peers. Instructors, topics, and specific learning objectives vary from term to term. **CROSSLISTED** as HORT 519. This course is repeatable for a maximum of 12 credits.

PBG 530. PLANT GENETICS (3). Introduction to the principles of plant genetics with an emphasis on the structure and function of economically important plant genomes. CROSSLISTED as HORT 430/HORT 530 and CSS 430/CSS 530. **PREREQS:** One year of biology and chemistry.

PBG 541. PLANT TISSUE CULTURE (4). Principles, methods, and applications of plant tissue culture. Laboratory is important part of course. Topics include callus culture, regeneration, somaclonal variation, micropropagation, anther culture, somatic hybridization, and transformation. Lec/lab. CROSSLISTED as HORT 441/HORT 541, MCB 541. **PREREQS:** (BI 311 and BOT 331) or HORT 430 or PBG 430

PBG 550. PLANT BREEDING (4). An introduction to the genetic improvement of self-pollinated, cross-pollinated, and asexually propagated species and the genetic principles on which breeding methods are based. Example are drawn from a wide range of crops, including cereal grains, grasses, fruits, nuts, and vegetables; guest lecturers discuss their breeding programs. Additional topics include crop evaluation, germplasm preservation, disease resistance, and biotechnology. CROSSLISTED as HORT 450/HORT 550, CSS 450/CSS 550. Lec/lab. **PREREQS:** BI 311 or CSS 430 or CSS 530 or PBG 430 or PBG 530 or HORT 430 or HORT 530

PBG 591. SELECTED TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PBG 598. PLANT CHROMOSOME BIOLOGY (3). Exploration of the relationship between chromosome number, structure, and behavior to gene inheritance, organization, and expression. Discussion of chromosome manipulation strategies for genomics research, genetic analysis, and plant breeding. **PREREQS:** 6 credits of genetics or equivalent.

PBG 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PBG 601. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

PBG 603. DISSERTATION (1-16). Graded P/N. This course is repeatable for a maximum of 999 credits.

PBG 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

PBG 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

PBG 620. DNA FINGERPRINTING (1). Principles and methods for producing and analyzing DNA fingerprints. Offered even years. CROSSLISTED as CSS 620 and MCB 620. **PREREQS:** BI 311 or CSS 430 or CSS 530 or PBG 430 or PBG 530 or HORT 430 or HORT 530 or equivalent.

PBG 621. GENETIC MAPPING (1). Principles and methods for constructing genetic maps comprised of molecular and other genetic markers. Offered even years. CROSSLISTED as MCB 621 and CSS 621. **PREREQS:** BI 311 or CSS 430 or CSS 530 or PBG 430 or PBG 530 or HORT 430 or HORT 530 or equivalent.

PBG 622. MAPPING QUANTITATIVE TRAIT LOCI (1). Principles and methods for mapping genes underlying phenotypically complex traits. Offered even years. CROSSLISTED as MCB 622 and CSS 622. **PREREQS:** CROP 590 or CSS 590 or ST 513 or equivalent.

PBG 650. ADVANCED PLANT BREEDING AND QUANTITATIVE GENETICS (3). Pedigree, bulk, single-seed-descent, doubled haploid, backcross, testcross, mass, and half-sib, S-1~, and S-2~ family breeding methods; breeding hybrids and selecting sources of alleles for developing superior hybrids; the nature and consequences of genotype by environment interactions; marker-assisted backcross and inbred line breeding; quantitative trait locus mapping; random linear models; designing and analyzing cultivar, line, and

family selection experiments. Offered odd years. **PREREQS:** (CSS 430 or CSS 530 or PBG 430 or PBG 530 or HORT 430 or HORT 530) and (CSS 450 or CSS 550 or PBG 450 or PBG 550 or HORT 450 or HORT 550) and (ST 411 or ST 511) and (ST 412 or ST 512) and (ST 413 or ST 513)

PBG 691. SELECTED TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PBG 699. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

■ SOIL SCIENCE COURSES

SOIL 101. INTRODUCTION TO HORTICULTURE, CROP, SOIL, AND INSECT SCIENCE (1). Introduces students with interests in horticulture, crop, soil, and insect sciences to educational and professional opportunities in these disciplines. Speakers will discuss opportunities in research and academia as well as in the applied professional job market. Open to all students. CROSSLISTED as CROP 101, ENT 101, HORT 101.

SOIL 102. *INTRODUCTION TO ENVIRONMENTAL SCIENCE AND SUSTAINABILITY (4). An introduction to the science behind critical environmental issues and the biological basis of creating and maintaining sustainable ecosystems. Focus on such questions as: how do we decide what to believe about environmental issues? How do we quantify, restore, and value biodiversity? What is valid science in the global warming debate? Lec/lab. (Bacc Core Course)

SOIL 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 199H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

SOIL 205. *SOIL SCIENCE (4). Introduction to the chemical, physical and biological nature of soils. Examines the functions of soil as a medium of plant growth, a recycling system for nutrients and wastes, a modifier of atmospheric chemistry, a habitat for soil organisms, a system for water purification, and an engineering medium. Field and laboratory projects provide an understanding of fundamental soil science principles and the impact of human activities on soil quality and sustainability. Lec/lab. Field trips required. (Bacc Core Course)

SOIL 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 299H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

SOIL 316. NUTRIENT CYCLING IN AGROECOSYSTEMS (3). Nutrient forms, transformations, and cycling. Diagnosis and correction of nutrient deficiencies, pH and salinity. Impact of nutrient management practices on crop production, soil health, nutrient use efficiency, and environmental quality. Organic and inorganic fertilization. Lec/lab. **PREREQS:** CH 121 and SOIL 205 or (CSS 205 or CSS 305)

SOIL 325. *AG AND ENVIRONMENTAL PREDICAMENTS: A CASE STUDY APPROACH (3). Evaluation of controversial agricultural and environmental problems. Production of clear oral and written documents describing and analyzing problems and specific courses of action utilizing team-building skills. (Writing Intensive Course) CROSSLISTED as CROP 325. **PREREQS:** (CSS 305 or CSS 205 or SOIL 205)

SOIL 335. *INTRODUCTION TO WATER SCIENCE AND POLICY (3). Policy and science of the hydrologic cycle. Emphasis on interaction between water's natural time-space fluctuations and human uses. (Bacc Core Course) CROSSLISTED as GEO 335.

SOIL 366. ECOSYSTEMS OF WILDLAND SOILS (3). Focuses on soils that occur in relatively undisturbed ecosystems such as forests and

rangelands. Topics covered include properties and processes specific to understanding and managing the soil resource in these areas. An overview of US Soil Taxonomy will also be given. **PREREQS:** (SOIL 205 or CSS 205 or CSS 305) and an understanding and appreciation of environmental chemistry, biology, ecology, and physics is needed for this course.

SOIL 395. *WORLD SOIL RESOURCES (3). The properties, global distribution, and agricultural productivity of major world soil groups are described. Potentials for human-accelerated soil degradation are introduced for each soil group, and reasons for conflicting assessments of degradation are discussed. (Bacc Core Course) CROSSLISTED as CSS 395. Offered via Ecampus only. **PREREQS:** CH 121 and /or equivalent.

SOIL 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 403. THESIS (1-16). Independent, original study and preparation of a senior thesis. This course is repeatable for a maximum of 16 credits. **PREREQS:** Senior standing.

SOIL 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Junior standing.

SOIL 405H. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Junior standing and Honors College approval required.

SOIL 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Junior standing.

SOIL 408. WORKSHOP (1-16). Evaluation and judging of soils in Oregon and other states; directed studies of soil morphology, soil survey, soil fertility, soil physics, soil chemistry, soil biology, and soil information systems. This course is repeatable for a maximum of 16 credits.

SOIL 409. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 410. INTERNSHIP (1-6). Professional work experience previously approved and supervised by the department, written report required. This course is repeatable for a maximum of 12 credits. **PREREQS:** Junior standing.

SOIL 435. ENVIRONMENTAL SOIL PHYSICS (3). Covers principles of soil physical properties and processes as they relate to agricultural, hydrological and environmental problems. Lec/lab. Offered odd years. **PREREQS:** (CSS 205 or CSS 305 or SOIL 205) and CH 123 and MTH 241 and PH 201 or equivalent.

SOIL 445. ENVIRONMENTAL SOIL CHEMISTRY (3). Structural chemistry of clay minerals and organic matter, cation and anion exchange, and soil solution equilibria of soils. Ion exchange, mineral-solution equilibria, and adsorption reactions of silicate clays, oxides, and organic matter are emphasized. Covers the sorption behavior of environmental contaminants and the weathering reactions that govern the transport of reactive solutes through soils. Lec/rec. Offered odd years.

SOIL 455. BIOLOGY OF SOIL ECOSYSTEMS (4). A detailed study of the organisms that live in the soil and their activities in the soil ecosystems, soil as a habitat for organisms, taxonomy and biology of soil organisms, fundamentals of nutrient cycles, special topics in soil biology, review basis of soil microbial and ecological principles. Lec/rec/lab. **PREREQS:** (CSS 305 or CSS 205 or SOIL 205). Courses in chemistry, physics, and microbiology are recommended.

SOIL 466. SOIL MORPHOLOGY AND CLASSIFICATION (4). Observation and description of soil properties in the field; writing

soil profile descriptions; evaluating criteria that define features used to classify soils; using soil classification keys. Lec/lab. **PREREQS:** (SOIL 205 or CSS 205 or CSS 305)

SOIL 468. SOIL LANDSCAPE ANALYSIS (4). Principles of soil geomorphology, soil stratigraphy, and surficial processes as applied to understanding the soil system and landscape scales. Emphasis on field observations of soils, geomorphic surfaces, and environment. Field project entails design of soil survey map units, field mapping and GIS cartographic techniques. Lec/lab. Offered even years. **PREREQS:** (SOIL 466* or CSS 466*)

SOIL 475. SOIL RESOURCE POTENTIALS (4). Course builds on knowledge from introductory pedology, soil chemistry, soil physics and soil biology to practice the evaluation of nutrient availability and soil moisture storage in the rooting space. Results from the application of pedotransfer functions to observations at the pit wall are translated into quantitative, numerical expressions of soil resource potentials. Lec/lab. **PREREQS:** (SOIL 435 and SOIL 455 and SOIL 466)

SOIL 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Junior standing.

SOIL 499H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Junior standing and Honors College approval required.

SOIL 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 503. THESIS/DISSERTATION (1-16). This course is repeatable for a maximum of 999 credits.

SOIL 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 508. WORKSHOP (1-16). Evaluation and judging of soils in Oregon and other states; directed studies of soil morphology, soil survey, soil fertility, soil physics, soil chemistry, soil biology, and soil information systems. This course is repeatable for a maximum of 16 credits.

SOIL 509. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 510. INTERNSHIP (1-6). Professional work experience previously approved and supervised by the department, written report required. This course is repeatable for a maximum of 6 credits.

SOIL 513. PROPERTIES, PROCESSES, AND FUNCTIONS OF SOILS (4). Physical, chemical, biological, and landscape properties; processes of fluid retention and movement, weathering and cation exchange, decomposition and C-N dynamics, erosion and sedimentation; functions of hydrologic regulation, nutrient cycling, environmental protection, ecological habitat. **PREREQS:** CH 223 or CH 233 or CH 233H or equivalent

SOIL 515. SOIL FERTILITY MANAGEMENT (3). Management of plant nutrients in agronomic systems; diagnosis of nutrient availability and prediction of crop response to fertilizers; interactions between nutrient response and chemical, physical and biological properties of soils. **PREREQS:** CSS 315 and courses in statistics, chemistry and plant physiology.

SOIL 523. PRINCIPLES OF STABLE ISOTOPES (3). An introduction to the theory and use of stable isotopes. Applications of stable isotopes to soil science, plant physiology, hydrology, and ecosystem studies. Offered even years.

SOIL 525. MINERAL-ORGANIC MATTER INTERACTIONS (3). Studies the fundamental properties of the mineral-organic interface and the mechanisms of interaction between mineral and organic soil properties. **PREREQS:** CSS 305 or CSS 205 or SOIL 205 or equivalent.

SOIL 535. SOIL PHYSICS (3). Theoretical elements of soil physical properties and processes related to agricultural, hydrological and environmental problems. Requires concurrent weekly laboratory: SOIL 536. Offered even years. **PREREQS:** CSS 305 or CSS 205 or SOIL 205. Recommended are MTH 241 and CH 123 and PH 201 or equivalent. **COREQS:** SOIL 536

SOIL 536. VADOSE ZONE HYDROLOGY LABORATORY (1). Experimental elements of soil physical properties and processes allowing practical experience in the measurement and analysis of soil physical processes related to agricultural, hydrological and environmental problems. Weekly laboratory. Offered even years. **PREREQS:** CH 123 and PH 201 or equivalent.

SOIL 545. ENVIRONMENTAL SOIL CHEMISTRY (3). Structural chemistry of clay minerals and organic matter, cation and anion exchange, and soil solution equilibria of soils. Ion exchange, mineral-solution equilibria, and adsorption reactions of silicate clays, oxides, and organic matter are emphasized. Covers the sorption behavior of environmental contaminants and the weathering reactions that govern the transport of reactive solutes through soils. Lec/rec. Offered odd years.

SOIL 547. NUTRIENT CYCLING (3). Reviews and discusses ecosystem-level biogeochemical concepts for terrestrial and freshwater ecosystems, primarily by reading and discussing classic and current literature to determine the state-of-knowledge and uncertainties associated with it. Topics include root nutrient uptake mechanisms, soil chemical and biochemical transformations in different soil and ecosystems, measuring soil solution and watershed fluxes, soil organic matter formation and structure, the meaning of sustainability, the concept of N saturation in terrestrial ecosystems, and the use of natural abundance and tracer isotopes in ecosystem biogeochemistry. While forest biogeochemical processes will be emphasized, desert, aquatic, wetland, and prairie ecosystems will also be explored. **CROSSLISTED** as BOT 547 and FS 547. **PREREQS:** College-level chemistry and biology and one class in ecology (BI 370 or equivalent) and/or soils (e.g. SOIL 205).

SOIL 555. BIOLOGY OF SOIL ECOSYSTEMS (4). A detailed study of the organisms that live in the soil and their activities in the soil ecosystems, soil as a habitat for organisms, taxonomy and biology of soil organisms, fundamentals of nutrient cycles, special topics in soil biology, review basis of soil microbial and ecological principles. Lec/rec/lab. **PREREQS:** CSS 305 or CSS 205 or SOIL 205. Courses in chemistry, physics, and microbiology are recommended.

SOIL 566. SOIL MORPHOLOGY AND CLASSIFICATION (4). Observation and description of soil properties in the field; writing soil profile descriptions; evaluating criteria that define features used to classify soils; using soil classification keys. Lec/lab. **PREREQS:** CSS 305 or CSS 205 or SOIL 205

SOIL 568. SOIL LANDSCAPE ANALYSIS (4). Principles of soil geomorphology, soil stratigraphy, and surficial processes as applied to understanding the soil system at landscape scales. Emphasis on field observations of soils, geomorphic surfaces, and environment. Field project entails design of soil survey map units, field mapping and GIS cartographic techniques. Lec/lab. Offered odd years. **PREREQS:** (CSS 566* or SOIL 566*)

SOIL 591. SELECTED TOPICS (1-16). Course content and title will change with each offering. This course is repeatable for a maximum of 16 credits.

SOIL 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 601. RESEARCH (1-16). Offered via Ecampus only. This course is repeatable for a maximum of 16 credits.

SOIL 603. THESIS/DISSERTATION (1-16). This course is repeatable for a maximum of 999 credits.

SOIL 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 608. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 635. ADVANCED SOIL PHYSICS (3). Explores theoretical development of a key topic in soil physics. Topics may include evaporation from porous media, multiphase fluid movement, soil deformation, and soil salinization, with respect to either historical development, present day understanding or future needs of the field. Course structure incorporates lectures and discussion requiring intensive student participation. Offered odd years. **PREREQS:** (CSS 535 or SOIL 535) and a working knowledge of soil physics and a passing grade in a graduate-level soil physics course.

SOIL 645. SOIL MICROBIAL ECOLOGY (3). An advanced treatment of current topics in soil microbiology, with an emphasis on the ecology of soil microorganisms. Topics include the size, composition, diversity, and activity of soil microbial communities, linkage of microbial community structure to ecosystem functions, and applications of molecular biology to soil microbiology. Offered even years. **PREREQS:** Recommend SOIL 455 or CSS 455 or MB 448.

SOIL 691. SELECTED TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 699. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ENTOMOLOGY PROGRAM

Sujaya Rao, Program Leader
Department of Horticulture
3017 ALS
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FACULTY

Botany and Plant Pathology
McEvoy

Crop and Soil Science Dreves, Reitz, Rao, Rondon

Environmental and Molecular Toxicology Jepson

Fish and Wildlife DeBano, Wooster

Forest Ecosystems and Society Ross

Horticulture Hooven, Lambrinos,

Langellotto-Rhodaback, Lee, Miller,

Rosetta, Sagili, Shearer, Walton

Zoology Giebultowicz, Lytle, Maddison, Marshall

Graduate students have the option of obtaining their degree in the specific academic department of their major professor.

Undergraduate Minor**Entomology**

(Administered by the Department of Horticulture in the College of Agricultural Sciences.)

Graduate Major**Entomology (MA, MAg, MS, PhD)**

*Graduate Area of Concentration
Entomology*

Graduate Minor**Entomology****GRADUATE AREA OF CONCENTRATION**

Graduate students pursuing an entomology area of concentration have the opportunity to study and conduct research within a number of graduate programs across the university in the Departments of Horticulture, Crop and Soil Science, Fisheries and Wildlife, and Forest Ecosystems and Society. Graduate students obtain their degree within the academic department of their major professor.

Entomologists continue to be at the forefront of basic and applied research in molecular biology, ecology, evolutionary biology, biodiversity, and pest management. The modern fields of physiology, ecology and systematics have their origins in research originally undertaken with insects, and entomologists help lead these disciplines today. Given the unique importance of insects in biodiversity and ecosystem processes, their roles in crop production and public health, and their value as model organisms for the exploration of basic scientific questions, there is demand for graduates who have acquired entomological expertise.

The Entomology Program is a component of the Agricultural Experiment Station, which has many research facilities for students and staff, including farms, greenhouses, an aquatic insect laboratory, and a forest insect research laboratory. In addition to OSU faculty, state and federal entomologists stationed across the state are available for consultation in their fields of specialization. The Oregon State Arthropod Collection has nearly 3,000,000 specimens of insects and mites and is a recognized center for research in insect systematics and biodiversity.

ENTOMOLOGY MINOR

The Entomology minor is administered by the Department of Horticulture in the College of Agricultural Sciences. Students pursuing any bachelor's degree may elect a minor in Entomology by satisfying a select set of courses related to insect science.

The Entomology minor is available to all OSU students. A minimum of 27 credits is required, at least 12 of which must be upper-division credits.

Select one course from the following:

ENT 311. Introduction to Insect Pest Management (4)

Z 365. Biology of Insects (4)

Select the remaining 23 credits from the following:

BOT/FES 415. Forest Insect and Disease Management (5)

ENT 101. Introduction to Horticulture, Crop, Soil, and Insect Science (1)

ENT 300. *Plagues, Pests, and Politics (3)

ENT 311. Introduction to Insect Pest Management (4)

ENT 322. Honey Bee Biology and Beekeeping (3)

ENT 401. Research (1–6)¹

ENT 405. Reading and Conference (1–6)

ENT 407. Seminar (1)

ENT 410. Internship (1–6)¹

ENT 420. Insect Ecology (3)

ENT 440. Issues in Insect Toxicology (3)

Ecampus only

ENT 499. Special Topics (1–16)

Z 365. Biology of Insects (4)

Z 440. Insect Physiology (3)

Z 477. Aquatic Entomology (4)

And entomology and life sciences courses approved in advance by the Entomology Minor advisor.

Total=27 minimum credits**Footnote:**

¹ Maximum 6 credits can be counted towards the minor from ENT 401 and ENT 410.

ENTOMOLOGY (MA, MAg, MS, PhD)**Graduate Areas of Concentration
Entomology**

The Entomology Graduate Program offers qualified candidates opportunities for graduate study and research leading to the Master of Arts, Master of Agriculture (nonthesis), Master of Science, and Doctor of Philosophy degrees. In keeping with traditional areas of strength at the university, a number of major research programs in entomology deal with problems in agriculture, forestry, and environmental quality. Integrated pest management techniques are emphasized in the solution of many of these problems.

There are no specific course requirements for entomology graduate degrees. Each student will work with their major professor and/or graduate committee to establish a program of study.

For additional information on the Entomology Graduate Program, see the program website at <http://entomology.oregonstate.edu/>.

ENTOMOLOGY GRADUATE MINOR

For more details, see the departmental advisor.

COURSES

ENT 101. INTRODUCTION TO HORTICULTURE, CROP, SOIL, AND INSECT SCIENCE (1).

Introduces students with interests in horticulture, crop, soil, and insect sciences to educational and professional opportunities in these disciplines. Speakers will discuss opportunities in research and academia as well as in the applied professional job market. Open to all students. **CROSSLISTED** as CROP 101, HORT 101, SOIL 101.

ENT 300. *PLAGUES, PESTS, AND POLITICS (3). Integration and interaction of agricultural and public health aspects of entomology in society and history. **CROSSLISTED** as BI 300 and HORT 330. (Bacc Core Course)

ENT 311. INTRODUCTION TO INSECT PEST MANAGEMENT (4). Identification, biology and management of injurious and beneficial insects. Concurrent laboratory is designed to provide hands-on experience with identification of insect groups of relevance to agricultural cropping systems. Lec/lab. **PREREQS:** Entomology course work or one year college biology.

ENT 320. FUNDAMENTALS OF INSECT SCIENCE (2). An overview of insect biology from the perspective of plant production systems to serve students pursuing one of three tracks: 1) no further entomology, 2) enrolled concurrently with a separate but complimentary lab course (ENT 321), or 3) a prerequisite to an Introduction to Pest Management, ENT 323 and ENT 324. The primary objective of the course is to present the fundamental principles of morphological, physiological, and ecological relationships among the insects in the context of pest management.

ENT 321. FUNDAMENTALS OF INSECT SCIENCE LABORATORY (1). A hands-on experience integrating information on morphological, physiological, and ecological relationships among insects in the context of pest management. **PREREQS:** ENT 320*

ENT 322. HONEY BEE BIOLOGY AND BEEKEEPING (3). In this introduction to the fascinating honey bee and its biology, honey bees are used as model organisms to illustrate general principles of biology, entomology, and sociobiology. Students will learn the basics of beekeeping, have an opportunity to manipulate honey bee colonies, and gain hands-on experience, prevailing winter weather permitting.

ENT 331. *POLLINATORS IN PERIL (3). Pollinators, human influences on pollination systems, and the potential consequences of pollinator decline. An introduction to the skills needed to investigate media reports and multidisciplinary scientific research. Effects of pesticides, habitat fragmentation, climate change, invasive species, pests, pathogens, and other threats to pollinators in critical natural and agricultural systems around the world. **PREREQS:** Completion of a Baccalaureate Core biological science course. **CROSSLISTED** as HORT 331. (Bacc Core Course)

ENT 401. RESEARCH (1-16). Work on approved problems carried on in the library, laboratory or field. This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor approval required.

ENT 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Junior standing.

ENT 405. READING AND CONFERENCE (1-16). Reading and discussions on special topics. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENT 407. SEMINAR (1-2). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENT 410. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor approval required.

ENT 420. INSECT ECOLOGY (3). Insect ecology, evolution, and management. Biophysical ecology; foraging and feeding; life cycles; population

dynamics, regulation, and control; species interactions including herbivore-plant, predator-prey, parasite-host, competition, and mutualism; diversity, food web structure, agricultural ecology, exercises merge models, experiments, and sampling. Offered on even years. **PREREQS:** BI 370 or equivalent

ENT 440. ISSUES IN INSECT TOXICOLOGY (3). Introduction to concepts and mechanisms associated with molecular toxicology as it relates to insects, including interactions with naturally occurring and synthetic compounds. Overview of current research in insect toxicology including resistance to pesticides, protection of non-target species, and use of insects as model organisms. Discussion of laboratory and field approaches and potential strategies to address issues in insect toxicology. **PREREQS:** A background in basic chemistry and biology is recommended.

ENT 499. SPECIAL TOPICS (1-6). This course is repeatable for a maximum of 6 credits.

ENT 501. RESEARCH (1-16). Work on approved problems carried on in the library, laboratory or field. This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor approval required.

ENT 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

ENT 505. READING AND CONFERENCE (1-16). Reading and discussions on special topics. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENT 507. SEMINAR (1-2). Graded P/N. This course is repeatable for a maximum of 16 credits.

ENT 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

ENT 509. PRACTICUM (1-16). Taught every Fall, Winter, and Spring term. This course is repeatable for a maximum of 16 credits.

ENT 510. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits.

ENT 518. CURRENT TOPICS IN ENTOMOLOGY (2). This is a core course of the Horticulture graduate program. Provides an advanced understanding of entomology and its relationship to other disciplines through critical analysis of the scientific literature. Students practice synthesizing information and presenting findings to peers. Instructors, topics, and specific learning objectives vary from term to term. **CROSSLISTED** as HORT 518. This course is repeatable for a maximum of 12 credits.

ENT 520. INSECT ECOLOGY (3). Insect ecology, evolution, and management. Biophysical ecology; foraging and feeding; life cycles; population dynamics, regulation, and control; species interactions including herbivore-plant, predator-prey, parasite-host, competition, and mutualism; diversity, food web structure, agricultural ecology, exercises merge models, experiments, and sampling. Offered even years. **PREREQS:** BI 370 and Z 365 or equivalent

ENT 540. ISSUES IN INSECT TOXICOLOGY (3). Introduction to concepts and mechanisms associated with molecular toxicology as it relates to insects, including interactions with naturally occurring and synthetic compounds. Overview of current research in insect toxicology including resistance to pesticides, protection of non-target species, and use of insects as model organisms. Discussion of laboratory and field approaches and potential strategies to address issues in insect toxicology. **PREREQS:** A background in basic chemistry and biology is recommended.

ENT 542. PRINCIPLES OF INTEGRATED PEST MANAGEMENT: SYSTEMS DESIGN (4). Principles of integrated pest management design focusing on the use of systems analysis as a means to integrate management tactics, environmental and biological monitoring, pest control models, and implementation elements into

a cohesive whole. Introduction to integrated pest management on websites. Students will design a hypothetical crop-pest management system. Lec/lab. **PREREQS:** ENT 311

ENT 599. SPECIAL TOPICS (1-16). Important topics of current interest in the areas of systematics, insect physiology and toxicology, ecology and behavior, and pest management. Course content and title will change with each offering. This course is repeatable for a maximum of 16 credits.

ENT 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor approval required.

ENT 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

ENT 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor approval required.

ENT 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

ENT 699. SPECIAL TOPICS (1-16). Important topics of current interest in the areas of systematics, insect physiology and toxicology, ecology and behavior, and pest management. Course content and title will change with each offering. This course is repeatable for a maximum of 16 credits.

ENVIRONMENTAL AND MOLECULAR TOXICOLOGY

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FACULTY

Professors Baird, Dashwood, Field, Hays, Jenkins, Jepson, Kerkvliet, Miller, Williams

Associate Professors Anderson, Buermeyer, Simonich, Sudakin, Tanguay
Assistant Professors Bennett, Harper, Kolluri, Stone

Senior Research Assistants
Hoffman, Johnson, Siddens

ADJUNCT/COURTESY/AFFILIATE FACULTY

Allen, Fairbrother, Gold, Ho, Iversen, Kisby, Koop, Lein, Proteau, Simon, Stubblefield, Turker

Undergraduate Minor Toxicology

Graduate Major Toxicology (MAG, MS, PhD)

Graduate Areas of Concentration
Environmental Chemistry and
Ecotoxicology
Mechanistic Toxicology
Molecular and Cellular Toxicology
Neurotoxicology

Graduate Minor Toxicology

The Department of Environmental and Molecular Toxicology offers courses leading to MAg, MS, and PhD degrees in toxicology.

Training in toxicology prepares students for careers in industry, government, and academic institutions. Biochemical, chemical, and molecular research approaches are emphasized, focusing on the following areas: analytical and exposure assessment, aquatic, biochemical, comparative, environmental, food, immuno- and neurotoxicology.

Research is promoted by the faculty's close ties to the National Institute of Environmental Health Sciences (NIEHS), which supports the Environmental Health Sciences Center at OSU. The center contributes additional research and training opportunities for students. Opportunities in the area of neurotoxicology are provided by scientists of The Center for Research on Occupational and Environmental Toxicology (CROET) at Oregon Health and Sciences University.

Financial support is available to most students in the program through graduate research assistantships or from an NIEHS environmental health predoctoral training program. Completing the application by the end of January assures full consideration for funding for fall of that year.

Students who wish to enter the program should have a BS degree (or equivalent) in a science related field and are expected to select an MAg, MS, or PhD curriculum related to their own area of specialization. Students will take a core set of courses and will attend and participate in the toxicology seminar class. Courses in toxicology also may be taken by students in engineering or the basic sciences.

PhD PRELIMINARY EXAM GUIDELINES

Objective

The overall objective of the preliminary examination for advancement to PhD candidacy should assess whether a graduate student has the capacity and promise to:

1. understand the basic science of environmental and molecular toxicology;
2. be a creative and critical thinker;
3. understand the scientific literature;
4. conduct original and independent research; and
5. communicate the ideas and results of experiments.

Thus, the ideal examination format would select from these characteristics and prepare the student for the selective pressures that will be encountered upon completing the Environmental and Molecular Toxicology PhD degree program. In order to maintain high standards and produce quality graduate students, the

examination must be rigorous and challenging. In addition, the exam format should set specific limits on the amount of time that the student dedicates to this process.

Exam Format

The preliminary examination format outlined below consists of both oral and written elements. This examination must be completed no later than the end of the eighth academic term (not including summer terms) after entering the program. In most cases, the student would schedule the exam in the fall term of the third year of residence, although students may take the exam earlier, after completing at least one year in the program. The examination consists of a written and oral presentation of a research proposal that cannot be closely related to the student's thesis project. As outlined, the student's ability to develop, research, and defend original scientific ideas would be evaluated. The student is expected to demonstrate a capacity for critical thinking and a command of the specific field of focus. In addition, the student's general knowledge of environmental and molecular toxicology would be evaluated.

Procedural Outline

Research Proposal (written/oral)

1. Student submits outline descriptions (required elements listed below) of two potential research projects. The subject of each project must be chosen by the student based on their knowledge and review of the literature, and must describe original, hypothesis-driven research. The proposed projects cannot have been defined previously in published or unpublished form (i.e. manuscript, abstract, database of funded projects, submitted grant application, etc.), or cannot be known to be in progress. Proposed research also must not be closely related to the thesis research of the student. "Closely related" is defined as any research that conceivably could be part of the student's thesis or that conceivably might be initiated by the student's major professor.

Project outlines (limited to one page each) must include:

- a. Description of an unresolved question relevant to the field of environmental and molecular toxicology. (1–3 sentences)
- b. Statement of specific hypothesis to be tested. (1–2 sentences)
- c. Description of an experimental approach designed to test the hypothesis, including a minimum of two specific aims, and a statement of the rationale (justification) for the proposed

approach. (2–6 sentences)

- d. Statement of the significance of the proposed research. (1–2 sentences)
2. The student's graduate committee reviews both outlines and approves one topic to be developed into a written proposal. The research topic is chosen based on originality, quality, potential significance, and likelihood of expanding the student's education and training. Approval of the topic would occur within one week after the outlines are submitted. During this period the outlines would be returned to the student, and the student would receive feedback from the committee concerning the quality and design of the outlined projects. Major strengths and weaknesses in the experimental design or rationale would be identified.
 3. Student develops a written research proposal using the format and topic guidelines of application for the EPA, NIH, NSF, or other appropriate granting agency. The written proposal must be completed and returned to the committee within four weeks after the topic was approved. The scope of the project will be equivalent to that of a "pilot project" proposal and if conducted would be expected to take approximately one year of research time. The proposal is limited in length to 10 pages of double-spaced text (12 point font with 0.5 inch margins), and must include the following elements:
 - a. **Specific Aims.** State concisely and realistically what the research described in this application is intended to accomplish and what hypothesis is to be tested. Do not exceed one page.
 - b. **Background and Significance.** Briefly describe the background to the present proposal, critically evaluating the existing literature and specifically identifying gaps, which the project is intended to fill. State concisely the importance of the research described in this application, and relate the specific aims to the long-term objectives. Limited to two pages.
 - c. **Research Design and Methods.** Discuss in detail the experimental design and procedures to be used to accomplish the specific aims of the project. Describe the protocols to be used and the tentative sequence of investigation. Include the means by which

the data will be analyzed and interpreted. Discuss the potential difficulties and limitations of the proposed research and alternative approaches to achieve the aims. Point out any procedures, situations, or materials that may be hazardous to personnel and the precautions to be exercised. Limited to seven pages.

- d. **Literature Cited.** Do not scatter literature citations throughout the text. List them at the end of the proposal. All papers cited in the text must be listed in the reference list and vice versa. The list of literature citations at the end of the proposal do not count toward the 10-page limit.
 - e. **Appendix.** Students may include additional figures in an appendix, limited to five pages. The appendix may not be used to circumvent the page limits of the proposal.
4. The oral exam should be scheduled within two weeks of completion of the written proposal. This deadline can be extended with the approval of the student's graduate committee.
 5. During the exam the student would present the research plan and defend the experimental approach. Presentation would involve a seminar format with slides/overheads and would be expected to last no longer than 30 minutes. Following the presentation, the student would be judged on the soundness of the hypothesis, their understanding of the subject matter, their ability to defend the proposed experimental design, and their general knowledge of the field of environmental and molecular toxicology. The exam is expected to last approximately two hours, and is limited in length to three hours.

Examination Committee

The examination committee is the graduate student's doctoral committee. The doctoral committee consists of a minimum of five members of the graduate faculty, including at least two members from the major department and a representative of the Graduate Council. If a minor is declared, the committee must include a member from the minor department. All committee members must be on the graduate faculty with appropriate authorization to serve on the student's committee. The major professor would serve as the chairperson of the committee to oversee the exam. The decision concerning whether the student merits advancement to PhD candidacy would be the responsibility of the examination committee.

Evaluation

The basic question for the committee is whether or not they believe the student is adequately prepared to conduct doctoral level research and has a good chance of successfully completing such research. Following a discussion of the student's performance on the examination, each committee member is then asked to vote on the basic question. It is appropriate for secret ballots to be used, and secret ballots must be used if requested by any committee member.

If there is one negative vote on this question, the student will **pass**. If there are two or more negative votes on this question, the student will **not pass**.

If the committee decision is that the student has not passed the examination, the committee must then decide whether or not to allow the student to take a **re-examination**. If the majority of the committee votes in favor of a re-examination, the recommendation for re-examination should be recorded. In addition, the committee must set a time interval that must elapse before the re-examination is permitted. If the majority of the committee votes against a re-examination, the recommendation to terminate the student's work toward this degree should be recorded.

TOXICOLOGY MINOR

The Toxicology minor provides basic and applied science majors sufficient background for technical work in toxicology.

Required

BB 450. General Biochemistry (4)

or BB 490. Biochemistry (3)

CH 334. Organic Chemistry (3)

ST 351. Introduction to Statistical Methods (4)

TOX 411. Fundamentals of Toxicology (3)

Select five courses from the following or two courses plus undergraduate research:

BI 314. Cell and Molecular Biology (4)

TOX 401. Research (9)

TOX 413. Environmental Toxicology and Risk Assessment (3)

TOX 429. Toxic Substances in Food (3)

TOX 430. Chemical Behavior in the Environment (3)

TOX 455. Ecotoxicology: Aquatic Ecosystems (3)

TOX 490. Environmental Forensic Chemistry (3)

Total=28

TOXICOLOGY (MAG, MS, PhD)

Graduate Areas of Concentration
Environmental chemistry and ecotoxicology, mechanistic toxicology, molecular and cellular toxicology, neurotoxicology

The Department of Environmental and Molecular Toxicology provides students with a fundamental knowledge of toxicology that prepares them for responsible

positions in research and development, academia, government, professional services, or research foundations.

The graduate faculty includes scientists with special interest in application of chemistry, biochemistry, molecular biology, pharmacology, pathology, neuroscience, immunology and ecology to problems in toxicology. The concentration in neurotoxicology is an interinstitutional alliance with Oregon Health and Science University (OHSU). Students will be affiliated with and advised by associated faculty.

For the MAG, MS, and PhD degrees, students are required to take a core curriculum plus elective courses connected with their particular area of specialization. In addition to completing appropriate course work, students will undertake a thesis research project related to some aspect of toxicology. Participation in the seminar program (a one-hour per week seminar) is mandatory.

Minimal prerequisites for admission include one year each of biology, organic chemistry, physics, and statistics. Students who do not meet all of these requirements may be admitted if their academic record is otherwise outstanding.

TOXICOLOGY GRADUATE MINOR

For more details, see the departmental advisor.

COURSES

TOX 360. *THE WORLD OF POISONS (3).

Provides a basic understanding of how we are exposed and respond to chemicals, examples of human diseases associated with toxic insult, the role of technology and the interface of society and toxicology in risk perception and legislation. (Bacc Core Course) **PREREQS:** One 3-credit course in chemistry or one 3-credit course in biology.

TOX 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

TOX 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

TOX 411. FUNDAMENTALS OF TOXICOLOGY (3).

Introduction to the discipline of toxicology. Examination of the basic concepts that define how chemicals are absorbed, distributed, metabolized, and eliminated by the body. Overview of associated dose/response relations. **PREREQS:** (BB 350* or BB 450* or BB 490*)

TOX 413. ENVIRONMENTAL TOXICOLOGY AND RISK ASSESSMENT (3). Procedures for defining exposure and the use of toxicological data in defining risk assessment. Recent application of mechanistic concepts are reviewed. **PREREQS:** TOX 411

TOX 429. TOXIC SUBSTANCES IN FOOD (3). Toxicology and epidemiology of human exposures to pesticides and food toxicants. **PREREQS:** (BB 350* or BB 450* or BB 490*) and .

TOX 429H. TOXIC SUBSTANCES IN FOOD (3). Toxicology and epidemiology of human exposures to pesticides and food toxicants. **PREREQS:** (BB 350* or BB 450* or BB 490*) and Honors College approval required.

TOX 430. CHEMICAL BEHAVIOR IN THE ENVIRONMENT (3). Applications of chemical concepts in the definition and solution of

pollution problems; analytical considerations, thermodynamic factors influencing movement of chemicals, physical and metabolic transformations occurring in the environment. **PREREQS:** (CH 123 or CH 331) and senior standing

TOX 435. *GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK (3).

A multidisciplinary course that examines the scientific, social, political, economic, environmental, and ethical controversies surrounding agricultural and natural resource biotechnologies. Lec/lab/rec. **CROSSLISTED** as BI 435/BI 535, FES 435/FES 535, MCB 535. (Bacc Core Course)

TOX 435H. *GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK (3).

A multidisciplinary course that examines the scientific, social, political, economic, environmental, and ethical controversies surrounding agricultural and natural resource biotechnologies. Lec/lab/rec. **CROSSLISTED** as BI 435/BI 535, BI 435H, FES 435/FES 535, MCB 535. (Bacc Core Course) **PREREQS:** Honors College approval required.

TOX 455. ECOTOXICOLOGY: AQUATIC ECOSYSTEMS (3).

Focuses on transport, fate, and effects of toxic substances in freshwater ecosystems. There is special emphasis on impacts on fish. **PREREQS:** CH 331

TOX 490. ENVIRONMENTAL FORENSIC CHEMISTRY (3).

Principles of Good Laboratory Practice Standards, methodology, utility and limitations of chemical forensic methods as applied to real investigations. **PREREQS:** One year of college chemistry and one term of organic chemistry.

TOX 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

TOX 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

TOX 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

TOX 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

TOX 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

TOX 511. FUNDAMENTALS OF TOXICOLOGY (3).

Introduction to the discipline of toxicology. Examination of the basic concepts that define how chemicals are absorbed, distributed, metabolized, and eliminated by the body. Overview of associated dose/response relations. **PREREQS:** (BB 550* or BB 590*)

TOX 512. TARGET ORGAN TOXICOLOGY (3).

Examination of toxicological effects of chemicals at organ level. Normal physiology of the organ system is reviewed. **PREREQS:** TOX 511

TOX 513. ENVIRONMENTAL TOXICOLOGY AND RISK ASSESSMENT (3). Procedures for defining exposure and the use of toxicological data in defining risk assessment. Recent application of mechanistic concepts are reviewed. **PREREQS:** TOX 511

TOX 529. TOXIC SUBSTANCES IN FOOD (3).

Toxicology and epidemiology of human exposures to pesticides and food toxicants. **PREREQS:** BB 350* or BB 450* or BB 490*

TOX 530. CHEMICAL BEHAVIOR IN THE ENVIRONMENT (3).

Applications of chemical concepts in the definition and solution of pollution problems; analytical considerations, thermodynamic factors influencing movement of chemicals, physical and metabolic transformations occurring in the environment. **PREREQS:** CH 106 and CH 331 and graduate standing.

TOX 535. GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK (3).

A multidisciplinary course that examines the scientific, social, political, economic,

environmental, and ethical controversies surrounding agricultural and natural resource biotechnologies. Lec/lab/rec. CROSSLISTED as BI 535, FES 535, MCB 535.

TOX 554. GENOME ORGANIZATION, STRUCTURE, AND MAINTENANCE (4). How diverse organisms store their individual sets of genetic information (genomes). Evolution of genomes and gene families. Structures of DNA and chromosomes. Biochemical and regulatory pathways that protect cellular genomes against environmental and endogenous damage and ensure transmission of faithful copies to progeny. Remodeling of genomes by recombination and transposition. CROSSLISTED as MCB 554. **PREREQS:** BI 311 (genetics or equivalent) and (BB 450 and BB 451 and BB 452) or (BB 490 and BB 491 and BB 492) or equivalent.

TOX 555. ECOTOXICOLOGY: AQUATIC ECOSYSTEMS (3). Focuses on transport, fate, and effects of toxic substances in freshwater ecosystems. There is special emphasis on impacts on fish. **PREREQS:** CH 331

TOX 575. ADVANCED XENOBIOTIC METABOLISM (3). Familiarizes students with basic principles of drug/xenobiotic metabolism. Concepts addressed include: how foreign chemicals or xenobiotics are absorbed, distributed, and metabolized; induction and inhibition of metabolism; effect of age, species, hormones, and disease on metabolism; genetic polymorphisms; effect of diet and environment; experimental techniques in xenobiotic metabolism; and regulatory issues (FDA and EPA). **PREREQS:** Graduate or professional pharmacy student standing.

TOX 590. ENVIRONMENTAL FORENSIC CHEMISTRY (3). Principles of Good Laboratory Practice Standards, methodology, utility and limitations of chemical forensic methods as applied to real investigations. **PREREQS:** One year of college chemistry and one term of organic chemistry.

TOX 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

TOX 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

TOX 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

TOX 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

TOX 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

TOX 611. TESTING FOR GENOTOXICITY (4). A lab-based course geared toward toxicology, biochemistry, biology, food science, nutrition, pharmacy and MCB students. Introduces principles and methods of several key assays used to screen for DNA damage and mutation. These tests will include the following: (i) Salmonella mutagenicity assay (<Ames test>), (ii) single cell gel electrophoresis (<comet-> assay, (iii) micronucleus assay, and (iv) PCR-based single strand conformation polymorphism (SSCP) screening for oncogene/tumor suppressor gene mutation in cancers. This 2-week, intensive lab/lecture class runs Mon-Fri in the LPSC during the first session of summer term. Each day includes laboratory work and a 2-hour lecture covering basic principles of the assays, as well as technical details of the experiment for the day. **PREREQS:** TOX 514 and BB 400 series, prior course work on DNA repair and mutagenesis, and/or instructor approval.

TOX 675. HUMAN CARCINOGENESIS (3). Familiarizes students with the basic principles of molecular carcinogenesis with an emphasis on the current molecular understanding of cancer development in humans, and how such understanding influences diagnosis, treatment, and prevention strategies. **PREREQS:** (TOX

514 and (MCB 555 or BB 592)) and graduate or professional pharmacy standing

TOX 699. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

TOX 808. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

FISHERIES AND WILDLIFE

W. Daniel Edge, Head
104 Nash Hall
Oregon State University
Corvallis, OR 97331-3803
541-737-4531
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Website: <http://fw.oregonstate.edu/>

FACULTY

Professors Baker, Boehlert, Brandt, Edge, Kauffman, Kennedy, Herlihy, Hughes, Langdon, Mate, Noakes, Robinson, Sampson
Associate Professors Banks, Bartholomew, Burris, B. Dugger, DeBano, Ford, Garcia, Giannico, Hagen, Scott Heppell, Selina Heppell, Horning, J. Li, Miller, Suryan, Wooster
Assistant Professors Bowman, Epps, Friedlaender, Kappes, Klink, Levi, O'Malley, Palacios, Sanchez, Sidlauskas, Torres, Warren
Senior Instructor Hanschumaker
Instructors Allen, Duplaix, Goddard, Goggans, Moore, Mortenson, Paoletti, Reese, Snyder

COURTESY FACULTY

Professors Haig, Lackey, H. Li, Power, Roby, Schreck
Associate Professors K. Dugger, Kaufmann, Landers, Larson, Peterson, Stein, Thompson
Assistant Professors Brodeur, Burnett, Camarra, Chapman, Davison, Dumbauld, Dunham, Eagle-Smith, Ebersole, Fitzpatrick, Forsman, Gervais, Hurst, Jackson, Johnson, Jorden, Landys, McIntosh, Reeves, Rogers, Rosenberg, Ryer, Van Sickle
Instructors Boyer, Martin

ADJUNCT FACULTY

Professors Kent (Microbiology), Smith (Anthropology), Sylvia (Applied Economics), Webster (OSU Library)
Associate Professor Betts (Forest Ecosystems and Society)

Undergraduate Major

Fisheries and Wildlife Sciences (BS, CRED, HBS)
(See specializations section below.)

Minor

Fisheries and Wildlife Sciences

Graduate Majors

Fisheries and Wildlife Administration (PSM)

Fisheries Science (MAG, MAIS, MS, PhD)

Graduate Areas of Concentration

Aquaculture
Conservation Biology
Fish Genetics
Ichthyology
Limnology
Parasites and Diseases
Physiology and Ecology of Marine and Freshwater Fishes
Stream Ecology
Toxicology
Water Pollution Biology

Wildlife Science (MAG, MAIS, MS, PhD)

Graduate Areas of Concentration

Animal-Habitat Relationships
Behavior
Biology of Big Game and Small Mammals
Conservation Biology
Community Studies
Ecology of Avian and Mammalian Predators
Ecology of Waterfowl and Upland Gamebirds
Effects of Parasites, Diseases, and Environmental Contaminants
Nutrition
Population
Population Dynamics
Reproductive Biology
Toxicology of Pesticides
Wildlife Ecology
Wildlife-Forestry Interactions
Wildlife Science

Graduate Minors

Fisheries Science
Wildlife Science

Graduate Certificate

Fisheries Management
Wildlife Management

Fisheries and wildlife prepares students for professional careers in fisheries and wildlife as research scientists, biologists, managers, educators, and administrators. Oregon State University is strategically located for the study of fisheries and wildlife, surrounded by diverse ecosystems including the Pacific Ocean and coastal estuaries, many small and large rivers, lowland valleys, mountains and the high desert. Courses include traditional classroom experiences and laboratories, often enriched by field trips to nearby state fish hatcheries, national forests and wildlife refuges. We also offer experiential learning opportunities at the Hatfield Marine Science Center on the coast in Newport. In addition to our full-time faculty, FW students benefit from courses and mentoring provided by scientists with the Oregon Cooperative Fish and Wildlife Research Unit, Oregon Department of Fish and Wildlife, and several federal research centers.

The undergraduate curriculum is designed to develop a solid background in biology and ecology for our students as the basis for careers in resource science, conservation and management. However, FW is not simply a biological discipline. Professionals must weigh social considerations when formulating conservation and management strategies and policies. Consequently, biological, social, economic, and political science courses are integrated within the curriculum. The undergraduate curriculum is composed of core courses and a specialization. The core represents the educational foundation for fish and wildlife conservation, while the specialization provides each student with an opportunity to build a curriculum to meet specific goals. Our capstone courses emphasize critical thinking in natural resource science and management, as well as science communication and outreach. Students planning to transfer to FW should focus on courses in general biology, general chemistry, physical science, and mathematics during their freshman and sophomore years.

TRANSFER STUDENTS

Because of the technical and professional nature of the college's curricula, the college reserves the right to determine whether courses taken at another institution satisfy the college's curricular requirements. In general, equivalent college-level courses successfully completed at an accredited college or university are accepted. OSU students requesting transfer to the College of Agricultural Sciences' Department of Fisheries and Wildlife must be a student in good academic standing at the university. Please contact the departmental head advisor at 541-737-1941 for additional information.

GRADUATE PROGRAM

Graduate programs leading to the PSM, MAg, MS, or PhD (and participation in the MAg and MAIS degree programs) permit intensive study in special areas of interest under the guidance of nationally known scientists. Advanced study in fisheries science may be pursued in stream ecology, aquaculture, population dynamics in response to exploitation, ecology of marine and freshwater fishes, taxonomy and systematics, genetics, toxicology, and parasites and diseases of fish. Advanced study in wildlife science can involve almost any invertebrate or vertebrate species, biotic community or habitat. Research emphasis may be placed on population dynamics and utilization, life history and ecology, conservation biology, habitats, nutrition, physiology, behavior, and organization of animal communities. Opportunities exist for work in terrestrial, marine and aquatic systems.

FISHERIES AND WILDLIFE SCIENCES (BS, HBS)

The undergraduate curriculum for the Fisheries and Wildlife Sciences BS degree (180 credits) is composed of core courses as well as specializations of 24 credits. The core represents the educational foundation of fish and wildlife conservation, and the specializations provide the student with an opportunity to build his or her curriculum to meet specific goals. Working with faculty in formal and informal settings, students are encouraged to become engaged in designing their own education. The core courses required of all students seeking the BS degree are listed below.

For further information, see the Fisheries and Wildlife website at <http://fw.oregonstate.edu/>.

Specializations

Through the specialization, undergraduate students are encouraged to become engaged in designing their own education. Students work with faculty in formal and informal settings to define career and life goals and then develop a course of study to achieve those goals. Specialization plans should be developed during the junior year and will be presented to the faculty for review and comment. Specializations must contain at least 24 credits and must be upper division with four lower-division credits allowed. A maximum of two courses may be taken before formulation and review of the plan. All courses in the specialization are in addition to the courses in the fisheries and wildlife core. Specializations are given titles to reflect their content, but titles must not substantially duplicate titles of existing degree programs. Examples of specializations include forest wildlife management, stream ecology, fish and wildlife law enforcement, marine fisheries, aquaculture, avian conservation and management, conservation education and extension, fisheries business, human dimensions of resource management, conservation biology, and many others. Specializations may include typical on-campus courses, special field courses, a full term of course work at the Hatfield Marine Science Center in Newport, Oregon, or one or more terms of international exchange. Combined with required internships and a capstone course sequence and group project, fisheries and wildlife science graduates will be well-prepared to begin professional careers in fish and wildlife conservation, or to continue their education in graduate school. For those students unsure of their professional goals or seeking diversity in course work, a broad specialization may be declared.

Specialization guidelines may be viewed at http://fw.oregonstate.edu/system/files/u3034/guidelines_for_specializations_201303_1.pdf.

Internships

One of the best avenues to a permanent job in fisheries and wildlife is through a strong internship and temporary employment or volunteer positions. Students are required to complete a minimum of two internships or other approved alternative experiences (one of each type) for their degree. There are two types of internships: Exploratory (1–2 credits) and Intensive (3–6 credits). Students are encouraged to start gaining professional experience by volunteering or interning with a natural resource agency as early as possible, and no later than their junior year. This requirement is listed as FW 410, Internship (2 required) (4–6), under Fisheries and Wildlife Core below.

Baccalaureate Core

Synthesis, Perspectives, and Writing Intensive Courses (24 credits)

Communications (9 credits)

COMM 111. *Public Speaking (3)
or COMM 114. *Argument and Critical Discourse (3)
WR 121. *English Composition (3)
WR 222. *English Composition (3)
or HC 199. *Honors Writing–Science (3)
or PHL 121. *Reasoning and Writing (3)
or WR 327. *Technical Writing (3)
or WR 362. *Science Writing (3)

Fisheries and Wildlife Core (110–130 credits)

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)
BI 370. Ecology (3)
CH 121. General Chemistry (5)
and CH 122, CH 123. *General Chemistry (5,5)
OR CH 231, CH 232, CH 233. *General Chemistry (4,4,4)
and CH 261, CH 262, CH 263.
*Laboratory for Chemistry 231, 232, 233 (1,1,1)
FW 107. Orientation to Fisheries and Wildlife (1)
FW 251. Principles of Fish and Wildlife Conservation (3)
FW 255. Field Sampling of Fish and Wildlife (3)
FW 307. Specialization Development (1)
FW 320. Introductory Population Dynamics (4)
FW 321. Applied Community and Ecosystem Ecology (3)
FW 410. Internship (2 required) (4–6)
FW 488. Problem Solving in Fisheries and Wildlife Science (3)
FW 489. Effective Communications in Fisheries and Wildlife Science (3)
MTH 241. *Calculus for Management and Social Science (4)
or MTH 245. *Mathematics for Management, Life, and Social Sciences (4)
or MTH 251. *Differential Calculus (4)
ST 351, ST 352. Introduction to Statistical Methods (4,4)

Vertebrate Biology (7–9 credits)

Select one of the following (3–4 credits):

BI/FW 302. Biology and Conservation of

Marine Mammals (4)[Offered at HMSC or by Ecampus]

FW 311. Ornithology (3)

FW 315. Ichthyology (3)

FW 317. Mammalogy (3)

Z 473. Herpetology (3)

Select one of the following (2 credits):

FW 312. Systematics of Birds (2)

FW 316. Systematics of Fishes (2)

FW 318. Systematics of Mammals (2)

Z 474. Systematic Herpetology (2)

Select one additional course from the preceding two lists (2–4 credits)

Advanced Core

Genetics and Evolution, select one from below (3–5 credits):

ANS 378. Animal Genetics (4)

BI 311. Genetics (4)

BI 445. Evolution (3)

FW 370. Conservation Genetics (4)[Ecampus]

PBG 430. Plant Genetics (3)

Z 345. *Introduction to Evolution (3)

Z 422. Comparative Anatomy (5)

Behavior and Physiology, select two from below (6–8 credits):

ANS 311. Principles of Animal Nutrition (3)

ANS 314. Animal Physiology (4)

ANS 413. Comparative Nutrition of Domestic and Wild Animals (3)

BI/Z 350. Animal Behavior (3)

BOT 313. Plant Structure (4)

BOT 331. Plant Physiology (4)

FW 471. Environmental Physiology of Fishes (4)

FW 474. Early Life History of Fishes (4)

FW 475. Wildlife Behavior (4)

FW 476. Fish Physiology (4)

Z 423. Environmental Physiology (4)

Z 430. Principles of Physiology (4)

Z 431, Z 432. Vertebrate Physiology (4,4)

Z 437. Vertebrate Endocrinology (4)

Habitats and Ecosystems, select one from below (3–5 credits):

FES 341. Forest Ecology (3)

FES 342. Forest Types of the Northwest (3)

FES/FW 445. Ecological Restoration (4)

FW 426. Coastal Ecology and Resource Management (5)

FW 435. ^Wildlife in Agricultural Ecosystems (3)

FW/FOR/RNG 446. Wildland Fire Ecology (3)

FW 453. Forest Management and Wildlife Conservation (3)

FW 456. Limnology (5)

FW 467. Antarctic Science and Conservation (4) [Ecampus only]

FW 479. Wetlands and Riparian Ecology (3)

RNG 341. Rangeland Ecology and Management (3)

Z 351. Marine Ecology (3)

Species Conservation and Management, select two from below (6–8 credits):

FW 419. The Natural History of Whales and Whaling (3)

FW/BI 421. Aquatic Biological Invasions (4)

FW 451. Avian Conservation and Management (3)

FW 454. ^Fishery Biology (4)

FW 458. Mammal Conservation and Management (4)

FW/Z 464. Marine Conservation Biology (3)

FW 473. Fish Ecology (4)

FW 481. Wildlife Ecology (4)

Physical Sciences (9–14 credits): Choose 3 courses from the lists below. No more than 2 courses may be selected from any single category.

Physics and Math, select no more than two from below:

MTH 252. Integral Calculus (4)

MTH 268. Mathematical Ideas in Biology (4)

PH 201, PH 202, PH 203. *General Physics (5,5,5)

PH 211, PH 212, PH 213. *General Physics with Calculus (4,4,4)

PH 331. *Sound, Hearing, and Music (STS) (3)

PH 332. *Light, Vision, and Color (STS) (3)

Earth Sciences, select no more than two from below:

ATS 210. Introduction to the Atmospheric Sciences (3)

ATS 320. *The Changing Climate (STS) (3)

GEO 201. *Physical Geology (4)

GEO 202. *Earth Systems Science (4)

GEO 203. *Evolution of Planet Earth (4)

GEO 221. *Environmental Geology (4)

GEO 305. *Living with Active Cascade Volcanoes (STS) (3)

GEO 306. *Minerals, Energy, Water, and the Environment (STS) (3)

GEO 307. *National Park Geology and Preservation (STS) (3)

GEO 308. *Global Change and Earth Sciences (CGI) (3)

GEO 322. Surface Processes (4)

GEO 323. ^Climatology (4)

OC 331. Introduction to Oceanography (3)

OC 332. Coastal Oceanography (3)

SOIL 205. *Soil Science (4)

or CSS 305. Principles of Soil Science (4) [Taught at EOU LaGrande campus only.]

Chemistry, select no more than two from below:

BB 350. Elemental Biochemistry (4)

CH 130. General Chemistry of Living Systems (4)

CH 324. Quantitative Analysis (4)

CH 331, CH 332. Organic Chemistry (4,4)

CH 334, CH 335, CH 336. Organic Chemistry (3,3,3)

CH 390. Environmental Chemistry (3)

TOX 360. *The World of Poisons (STS) (3)

Human Dimensions, select 3 from list below (9–12 credits)

AG 301. *Ecosystem Science of Pacific NW Indians (DPD) (3)

ANTH 481. *Natural Resources and Community Values (STS) (3)

AREC 351. *Natural Resource Economics and Policy (CGI) (3)

AREC 352. *Environmental Economics and Policy (STS) (3)

AREC 432. Environmental Law (4)

BI 301. *Human Impacts on Ecosystems (CGI) (3)

BI/Z 349. *Biodiversity: Causes, Consequences, and Conservation (3)

BOT 322. Economic and Ethnobotany: Role of Plants in Human Culture (3)

FES 351. Recreation Behavior and Management (4)

FES 355. Management for Multiple Resource Values (3)

FES 360. Collaboration and Conflict Management (3)

FES 365. *Issues in Natural Resource Conservation (CGI) (3)[Ecampus only]

FES 432. Economics of Recreation Resources (4)

FOR 330. Forest Conservation Economics (4)

FOR/FE 456. *International Forestry (CGI) (3)

FOR 462. Natural Resource Policy and Law (3)

FW 325. *Global Crises in Resource Ecology (3)

FW 340. *Multicultural Perspectives in Natural Resources (DPD) (3)

FW 350. *Endangered Species, Society and Sustainability (STS) (3)

FW 360. *Origins of F&W Management—Evolution, Genetics, and Ecology (3)

FW 415. Fisheries and Wildlife Law and Policy (3)

FW/FES 439. ^Human Dimensions of Fisheries and Wildlife Management (3)

FW 462. Ecosystem Services (3)

FW/HSTS 470. *Ecology and History: Landscapes of the Columbia Basin (STS) (3)

FW/ANS/FES/FS/SOC 485. *Consensus and Natural Resources (STS) (3)

GEO 300. *Sustainability for the Common Good (3)

HST 481. *Environmental History of the United States (4)

HSTS 415. *^Theory of Evolution and Foundation of Modern Biology (STS) (4)

PHL 440. Environmental Ethics (3)

PHL 443. *World Views and Environmental Values (CGI) (3)

PS 475. Environmental Politics and Policy (4)

PS 476. *Science and Politics (STS) (4)

SOC 480. *Environmental Sociology (CGI) (3)

SOC 481. *Society and Natural Resources (4)

SOIL/GEO 335. *Introduction to Water Science and Policy (3)

Z/BI 349. *Biodiversity: Causes, Consequences, and Conversation (3)

Specialization (24 credits)

Total Minimum Credits=180

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

FISHERIES AND WILDLIFE SCIENCES MINOR

Also available via Ecampus.

A sequence in general biology equivalent to BI 211, BI 212, BI 213, *Principles of Biology (4,4,4), is a prerequisite to the Fisheries and Wildlife Sciences minor.

A minimum of 27 credits is required with a combination of the following courses. Double counting restrictions, when applicable, are listed for each section.

Required:

Double counting is allowed in this section.

BI 370. Ecology (3)
 FW 251. Principles of Fish and Wildlife Conservation (3)

Select a minimum of 7–9 credits from the following: One course may not be double counted.

FW 302. Biology and Conservation of Marine Mammals (4)
 FW 311. Ornithology (3)
 FW 312. Systematics of Birds (2)
 FW 315. Ichthyology (3)
 FW 316. Systematics of Fishes (2)
 FW 317. Mammalogy (3)
 FW 318. Systematics of Mammals (2)
 Z 473. Herpetology (3)
 Z 474. Systematic Herpetology (2)

Select a minimum of 12–14 credits from the following: None of these courses may be double counted.

FW 303. Survey of Geographic Information Systems in Natural Resources (3)
 FW 320. Introductory Population Dynamics (4)
 FW 321. Applied Community and Ecosystem Ecology (3)
 FW 323. Management Principles of Pacific Salmon in the Northwest (3)
 FW 325. *Global Crises in Resource Ecology (3)
 FW 326. Integrated Watershed Management (3)
 FW 340. *Multicultural Perspectives in Natural Resources (3)
 FW 346. Topics in Wildland Fire (3)
 FW 350. *Endangered Species, Society and Sustainability (3)
 FW 360. *Origins of Fisheries and Wildlife Management-Evolution, Genetics, and Ecology (3)
 FW 370. Conservation Genetics (4)
 FW 415. Fisheries and Wildlife Law and Policy (3)
 FW 419. The Natural History of Whales and Whaling (3)
 FW 421. Aquatic Biological Invasions (4)
 FW 426. Coastal Ecology and Resource Management (5)
 FW 427. Principles of Wildlife Diseases (4)
 FW 431. Dynamics of Marine Biological Resources (4)
 FW 435. ^Wildlife in Agricultural Ecosystems (3)
 FW 439. ^Human Dimensions of Fisheries and Wildlife Management (3)
 FW/FES 445. Ecological Restoration (4)
 FW 446. Wildland Fire Ecology (3)
 FW 451. Avian Conservation and Management (3)
 FW 453. Managed Forest and Wildlife Conservation (3)
 FW 454. ^Fishery Biology (4)
 FW 456. Limnology (5)
 FW 462. Ecosystem Services (3)
 FW 464. Marine Conservation Biology (3)
 FW 465. Marine Fisheries (4)
 FW 467. Antarctic Science and Conservation (4)
 FW 470. *Ecology and History: Landscapes of the Columbia Basin (3)

FW 471. Environmental Physiology of Fishes (4)
 FW 472. Advanced Ichthyology (3)
 FW 473. Fish Ecology (4)
 FW 474. Early Life History of Fishes (4)
 FW 475. Wildlife Behavior (4)
 FW 476. Fish Physiology (4)
 FW 479. Wetland and Riparian Ecology (3)
 FW 481. Wildlife Ecology (4)
 FW 485. *Consensus and Natural Resources (3)
 FW 491. Fish Diseases in Conservation Biology and Aquaculture (4)
 FW 499. Special Topics/Fisheries and Wildlife (1–4)

Total=27**Footnotes:**

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

GRADUATE MAJORS**FISHERIES AND WILDLIFE ADMINISTRATION (PSM)****Selina Heppell, Director**

Department of Fisheries and Wildlife
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 Corvallis, OR 97331
 541-737-9039
 Email: selina.heppell@oregonstate.edu
 Website: <http://psm.science.oregonstate.edu/fisheries-and-wildlife-administration>

The Professional Science Master's degree in Fisheries and Wildlife Administration (PSMFWA) provides advanced training for early- and mid-career professionals employed by natural resources agencies, non-government organizations, and other entities with a need for expertise in fisheries and wildlife science. Applicants must have at least 5 years of experience working in a natural resource field. The PSMFWA degree will help employers meet workforce planning goals and contribute to self-improvement goals of current employees.

The 57-credit PSMFWA curriculum is organized into four main sections:

1. Biophysical sciences core (23 credits)
2. Social sciences core (16 credits)
3. Business communication and management skills core (12 credits)
4. Internship (6 credits)

It is taught primarily as a distance, online curriculum via Ecampus, although some students may choose to work toward the PSMFWA degree while in residence at OSU or at the Hatfield Marine Science Center.

The PSMFWA degree is offered as a non-thesis program only. Students have an advisor and graduate committee to review their program of study, provide career and internship advice, and evaluate a final report based on the internship experience.

For general information about PSM programs, visit the PSM website <http://psm.science.oregonstate.edu/> or contact

the PSM Director, 2082 Cordley Hall, Corvallis OR 97331, 541-737-5259; email: kirstin.carroll@oregonstate.edu.

Course substitutions must be approved by the program coordinator.

Most of our courses are offered through Ecampus, but some may be offered through Corvallis, Cascades or Hatfield Marine Science Center. Please check course offerings through the online Catalog or consult with the program advisor.

Biophysical Sciences Core Courses (23 credits min)**Required:**

FW 537. Structured Decision Making in Natural Resource Management (2)

Plus 21 additional credits, with at least one Skills course: Fisheries and Wildlife-Related Science

BEE 512. Physical Hydrology (3)
 BOT 540. Field Methods in Vegetation Science (4)
 FES 536. Carbon Sequestration in Forests (2)
 FES 537. Belowground Ecosystems (3)
 FES 548. Biology of Invasive Plants (3)
 FW 519. The Natural History of Whales and Whaling (3)
 FW 520. Ecology and Management of Marine Fishes (3)
 FW 521. Aquatic Biological Invasions (4)
 FW 526. Coastal Ecology and Resource Management (5)
 FW 527. Principles of Wildlife Diseases (4)
 FW 535. Wildlife in Agricultural Ecosystems (3)
 FW/FES 545. Ecological Restoration (4)
 FW 551. Avian Conservation and Management (3)
 FW 553. Forest Wildlife Habitat Management (4)
 FW 554. Fishery Biology (4)
 FW 556. Limnology (5)
 FW 558. Mammal Conservation and Management (4)
 FW 562. Ecosystem Services (3) *Counts as FW core OR Human Dimensions*
 FW 563. Conservation Biology of Wildlife (3)
 FW 564. Marine Conservation Biology (3)
 FW 565. Marine Fisheries (4)
 FW/HSTS 570. Ecology and History: Landscapes of the Columbia Basin (3)
 FW 573. Fish Ecology (4)
 FW 575. Wildlife Behavior (4)
 FW 576. Fish Physiology (4)
 FW 579. Wetlands and Riparian Ecology (3)
 FW 580. Stream Ecology (3)
 FW 581. Wildlife Ecology (4)
 FW 599. Special Topics in Fisheries and Wildlife (2–4)
 SNR 530. Ecological Principles of Sustainable Natural Resources (3)
 SNR 540. Global Environmental Change (3)
Quantitative Skills in FW Science
 FW 524. Introduction to Fisheries Assessment (3)
 FW 531. Dynamics of Marine Biological Resources (4)
 FW 538. Structured Decision Making in Natural Resource Mgmt Lab (2)

FW 540. Vertebrate Population Dynamics (4)
 GEO 544. Remote Sensing (4)
 GEO 565. Geographic Information Systems and Science (4)
 ST 511. Methods of Data Analysis (4)
(Continues as ST 512, ST 513)

Social Sciences Core Courses (16 credits min.)

Required:

FW 620. Ecological Policy (3)
 or FW 515. Fisheries and Wildlife Law and Policy (3)
 FW/ANS/FES/FS/SOC 585. Consensus and Natural Resources (3)

Plus 10 additional credits, with at least one course from each group:

Policy Courses

AREC 532. Environmental Law (4)
 ES 544. Native American Law: Tribes, Treaties, and the U.S. (4)
 FW 522. Introduction to Ocean Law (3)
 GEO 523. Land Use in the American West (3)
 PS 575. Environmental Politics and Policy (4)
 PS 576. Science and Politics (4)
 PS 577. International Environmental Politics and Policy (4)

Human Dimensions Courses

ANTH 581. Natural Resources and Community Values (4)
 AREC 534. Environmental and Resource Economics (3)
 AREC/MRM 552. Marine Economics (3)
 FES 592. Ecosystem Services Ecology, Sociology, Policy (3)
 FW 562. Ecosystem Services (3) *Counts as FW core OR Human Dimensions*
 GEO 524. International Water Resource Management (3)
 GEO 525. Water Resources Management in the United States (3)
 MNR 511. Introduction to Sustainable Natural Resources (3)
 SNR 520. Social Aspects of Sustainable Natural Resources (3)
 SNR 521. Economics of Sustainable Natural Resource Management (3)
 SNR 522. Basic Beliefs and Ethics in Natural Resources (3)
 SNR 535. Sustainable Management of Aquatic and Riparian Resources (3)
 PHL 540. Environmental Ethics (3)
 PHL 543. World Views and Environmental Values (3)
 PHL 547. Research Ethics (3)
 SOC 556. Science and Technology in Social Context (4)
 SOC 580. Environmental Sociology (4)
 SOC 581. Society and Natural Resources (4)

Business, Communication, and Management Skills Core Courses (12 credits min.)

COMM 550. Communication and the Practice of Science (3)
 FES 593. Environmental Interpretation (4)
 FW 514. Professional Development: Meeting Communications (1)
 PS 579. Topics in Public Policy and Public Administration (4)
 PSM 513. Professional Skills (3)
 PSM 525. Advanced Scientific and Technical Writing (4)
 PSM 565. Accounting and Finance for

Scientists (3)
 PSM 566. Project Management and Marketing Scientific Technologies (3)
 PSM 567. Innovation Management (*PSM capstone*) (3)
 PSM 599. Special Topics (3)
 WRP 521. Water Conflict Management and Transformation (3)
 WRP 599. Special Topics (1–16)

Internship (6 credits min.)

FW 510 Professional Internship (1–16)
 or FW 506. Projects (1–6)

Total Credits=57 minimum

FISHERIES SCIENCE (MAG, MS, PhD, MAIS)

Graduate Areas of Concentration

Aquaculture, conservation biology, fish genetics, ichthyology, limnology, parasites and diseases, physiology and ecology of marine and freshwater fishes, stream ecology, toxicology, water pollution biology

The Department of Fisheries and Wildlife offers graduate work leading to the Master of Agriculture, Master of Science, and Doctor of Philosophy degrees (and participation in the MAg and MAIS degree programs) with majors in fisheries science.

Fisheries research in graduate studies involves quantitative analyses of marine and freshwater fish populations, water quality, fish systematics, fish and invertebrate physiology, stream ecology, modeling of aquatic ecosystems, land use interactions, endangered species, conservation biology, and aquaculture.

The Oregon Cooperative Fish and Wildlife Research Unit has active research programs funded in part by the Oregon Department of Fish and Wildlife and U.S. Geological Survey. The Agricultural Experiment Station, the Sea Grant program, Forest Science Laboratory and other organizations fund major research projects. The department maintains extensive collections of vertebrate species, which are curated by Doctors Sidlauskas (fish), Epps (mammals), and Dugger (birds).

For more information, visit <http://fw.oregonstate.edu>, or contact Lisa Pierson, Graduate Program Coordinator, Department of Fisheries and Wildlife, Nash Hall 104, OSU, Corvallis, OR 97331-3803, email: fw.gradadvising@oregonstate.edu.

WILDLIFE SCIENCE (MAG, MS, PhD, MAIS)

Graduate Areas of Concentration

Animal-habitat relationships; behavior; biology of big game and small mammals; conservation biology; community studies; ecology of avian and mammalian predators; ecology of waterfowl and upland gamebirds; effects of parasites, diseases, and environmental contaminants; nutrition; population; population dynamics; reproductive biology; toxicology of pesticides; wildlife ecology; wildlife-forestry interactions; wildlife science

The Department of Fisheries and Wildlife offers graduate work leading to the Master of Agriculture, Master of Science, and Doctor of Philosophy degrees (and participation in the MAg and MAIS degree programs) with majors in wildlife science.

The wildlife graduate program in the Department of Fisheries and Wildlife includes wildlife research concerning interaction of wildlife with land uses, migratory waterfowl, upland game birds, forest bird communities, endangered species, population dynamics, and conservation biology.

The Oregon Cooperative Fish and Wildlife Research Unit has active research programs funded in part by the Oregon Department of Fish and Wildlife and U.S. Geological Survey. The Agricultural Experiment Station, the Sea Grant program, Forest Science Laboratory and other organizations fund major research projects. The department maintains extensive collections of vertebrate species, which are curated by Doctors Sidlauskas (fish), Epps (mammals), and Dugger (birds).

For more information, visit <http://fw.oregonstate.edu>, or contact Lisa Pierson, Graduate Program Coordinator, Department of Fisheries and Wildlife, Nash Hall 104, OSU, Corvallis, OR 97331-3803, email: fw.gradadvising@oregonstate.edu.

GRADUATE MINORS

FISHERIES SCIENCE GRADUATE MINOR

For more details, see the departmental advisor.

WILDLIFE SCIENCE GRADUATE MINOR

For more details, see the departmental advisor.

CERTIFICATES

FISHERIES MANAGEMENT GRADUATE CERTIFICATE

Fisheries management is facing unprecedented challenges. Scientists, decision makers, and stakeholders must work together to rebuild over-fished stocks, implement ecosystem-based approaches, design global fisheries agreements, sus-

tain coastal fishing communities, reduce over-capacity and increase the cost-effectiveness of research and management.

Oregon State University's Graduate Certificate in Fisheries Management integrates diverse approaches and perspectives to find effective solutions for complex fisheries management problems at all levels, local to international.

Certificate Overview:

The graduate certificate is available for completion online or on-campus and is designed to accommodate the needs of private, agency and NGO professionals, decision-makers and graduate students in the U.S. and other nations.

Current Graduate Students: You must notify the Department of Fisheries and Wildlife of your intention to pursue this certificate. Upon consultation with the certificate program directors, you will be given instructions regarding listing courses on your program of study and obtaining the required signature for that form.

For more information, please see our program site on the Ecampus website at <http://ecampus.oregonstate.edu/online-degrees/graduate/fisheries-management/> and our departmental website at <http://fw.oregonstate.edu> or contact the program coordinator at fw.gradadvising@oregonstate.edu.

Professionals and other

students: You must notify the Department of Fisheries and Wildlife of your intention to pursue this certificate.

Please contact Certificate Program Director Dr. Selina Heppell, selina.heppell@oregonstate.edu, or Graduate Program Coordinator Lisa Pierson, lisa.pierson@oregonstate.edu.

The certificate requires:

- 18 credits of total course work, taken online and/or on-campus,
- A capstone project (applying knowledge and skills to a fisheries management issue), equivalent in time and effort to a 3-credit course;
- A minimum of two courses from the human dimensions area;
- A minimum of two courses from the fisheries science and ecology area;
- For further information, please see our website or email: fw.gradadvising@oregonstate.edu.

Courses are offered on-campus, at the Hatfield Marine Science Center, and/or online. Check the course catalog and schedule of classes for location and term offered.

Capstone project

FW 506. Projects (3 credits)

Human Dimensions Subject Area

Select at least 2 courses for a minimum 6 credits from below:

ANTH 581. Natural Resources and Community Values (4)

AREC 534. Environmental and Resource Economics (3)

AREC 552. Marine Economics (3)

COMM 540. Theories of Conflict and Conflict Management (3)

COMM 542. Bargaining and Negotiation Processes (3)

COMM 544. Third Parties in Dispute Resolution: Mediation/Arbitration (3)

COMM 546. Communication in International Conflict and Disputes (3)

FW 514. Professional Development: Meeting Communications (1)

FW 515. Fisheries and Wildlife Law and Policy (3)

FW 522. Introduction to Ocean Law (3)

FW 537. Structured Decision Making in Natural Resource Management (2)

FW 585. Consensus and Natural Resources (3)

FW 620. Ecological Policy (3)

MRM 521. Ocean Law (3)

MRM 530. Principles and Practice of Marine Resource Management (3)

MRM 535. Rights-Based Fisheries Management (3)

PS 575. Environmental Politics and Policy (4)

PS 576. Science and Politics (4)

PS 577. International Environmental Politics and Policy (4)

SOC 580. Environmental Sociology (4)

SOC 581. Society and Natural Resources (4)

Fisheries Science and Ecology

Subject Area:

Select at least 2 courses for a minimum 6 credits from below:

FE 530. Watershed Processes (4)

FW 519. The Natural History of Whales and Whaling (3)

FW 520. Ecology and Management of Marine Fishes (3)

FW 521. Aquatic Biological Invasions (4)

FW 524. Introduction to Fisheries Assessment (3)

FW 531. Dynamics of Marine Biological Resources (4)

FW 538. Structured Decision Making in Natural Resource Management Lab (2)

FW/FES 545. Ecological Restoration (4)

FW 554. Fishery Biology (4)

FW 556. Limnology (5)

FW 562. Ecosystem Services (3)

FW 564. Marine Conservation Biology (3)

FW 565. Marine Fisheries (4)

FW 571. Environmental Physiology of Fishes (4)

FW 573. Fish Ecology (4)

FW 574/OC 574. Early Life History of Fishes (4)

FW 576. Fish Physiology (4)

FW 579. Wetlands and Riparian Ecology (3)

FW 580. Stream Ecology (3)

FW 597. Aquaculture (3)

FW 599. Special Topics (2 or 4)

FW 620. Ecological Policy (3)

OEAS 540. The Biogeochemical Earth (4)

TOX 555. Ecotoxicology: Aquatic Ecosystems (3)

Total=18 credits

Other courses may be substituted upon approval of the certificate director.

WILDLIFE MANAGEMENT GRADUATE CERTIFICATE

All courses listed are offered online through Ecampus, and this graduate certificate is designed primarily for online students.

Curriculum

FW 506. Projects: *Capstone Project* (3)

Wildlife Sciences Core (2 courses minimum)

FS 545. Advanced Forest Community Ecology (4)[**Terminated 201401**]

FS 548. Biology of Invasive Plants (3) [**Terminated 201401**]

FW 519. The Natural History of Whales and Whaling (3)

FW 521. Aquatic Biological Invasions (4)

FW 527. Principles of Wildlife Diseases (4)

FW 535. Wildlife in Agricultural Ecosystems (3)

FW 538. Structured Decision Making in Natural Resource Management Lab (2)

FW 540. Vertebrate Population Dynamics (4) (Ecampus Only)

FW 545. Ecological Restoration (4)

FW 551. Avian Conservation and Management (3)

FW 553. Forest Wildlife Habitat Management (4)

FW 558. Mammal Conservation and Management (4)

FW 562. Ecosystem Services (3) *counts as FW core OR Human Dimensions*

FW 563. Conservation Biology of Wildlife (3)

FW 575. Wildlife Behavior (4)

FW 579. Wetlands and Riparian Ecology (3)

FW 581. Wildlife Ecology (4)

SNR 530. Ecological Principles of Sustainable Natural Resources (3) (Ecampus Only)

SNR 540. Global Environmental Change (3) (Ecampus Only)

Human Dimensions Core

(2 courses minimum)

ANTH 581. Natural Resources and Community Values (4)

AREC 532. Environmental Law (4)

AREC 534. Environmental and Resource Economics (3)

AREC 553. Public Land and Resource Law (4)[**Terminated 201201**]

FS 592. Ecosystem Services Ecology, Sociology, Policy (3)[**Terminated 201401**]

FW 515. Fisheries and Wildlife Law and Policy (3)

FW 537. Structured Decision Making in Natural Resource Management (2)

FW 562. Ecosystem Services (3) *Counts as FW core OR Human Dimensions*

FW 585. Consensus and Natural Resources (3)

FW 620. Ecological Policy (3)

PHL 540. Environmental Ethics (3)

PHL 543. World Views and Environmental Values (3)

PS 575. Environmental Politics and Policy (4)

PS 577. International Environmental Politics and Policy (4)

SNR 520. Social Aspects of Sustainable Natural Resources (3) (Ecampus Only)

SNR 521. Economics of Sustainable Natural Resource Management (3) (Ecampus Only)

SNR 522. Basic Beliefs and Ethics in Natural Resources (3) (Ecampus Only)
 SOC 580. Environmental Sociology (4)
 SOC 581. Society and Natural Resources (4)
 WRP 599. Special Topics (3)

Skills Courses (1 course recommended)

BOT 540. Field Methods in Vegetation Science (4)
 FS 523. Natural Resource Data Analysis (4) [Terminated 201401]
 FW 514. Professional Development: Meeting Communications (1)
 GEO 544. Remote Sensing (4)
 GEO 565. Geographic Information Systems and Science (4)
 ST 511. Methods of Data Analysis (4) (Continues as ST 512, 513)

COURSES

FW 107. ORIENTATION TO FISHERIES AND WILDLIFE (1). Information relevant to academic pathways and career planning in the fields of fisheries and wildlife. Graded P/N.

FW 111. INTRODUCTION TO MARINE LIFE IN THE SEA (1). A field-focused learning experience, this inquiry-based course is a basic overview of the marine life and environment on the Oregon coast, including rocky shores, sandy beaches, mud flats, bays, estuaries, and watersheds. Through lectures, lab and field experiences, students will examine important marine organisms in their habitat, exploring their ecological niches and adaptations to their environment along the Oregon coast. Graded P/N. **CROSSLISTED** as BI 111. **PREREQS:** High school biology and chemistry.

FW 199. SPECIAL STUDIES (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

FW 199H. SPECIAL STUDIES (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

FW 209. CAREER SKILLS IN FISHERIES AND WILDLIFE SCIENCES (1). A foundation for life-long career development in fisheries and wildlife sciences. Practice the skills needed to search, apply, and attain internships and jobs. Graded P/N.

FW 251. PRINCIPLES OF FISH AND WILDLIFE CONSERVATION (3). History of conservation and natural resource use; ecological principles, and social and economic limitations of conservation; principles and practices of wildlife and fisheries management; role of research in management. **PREREQS:** Recommend one course in introductory biology.

FW 255. FIELD SAMPLING OF FISH AND WILDLIFE (3). Introduction to sampling populations and communities of vertebrate animals emphasizing sampling design, collection and management of data, and communication of results. Weekend field trips. Laboratory fee assessed. **PREREQS:** WR 121 and familiarity with personal computers.

FW 302. BIOLOGY AND CONSERVATION OF MARINE MAMMALS (4). An examination of the biology of whales, pinnipeds, and other marine mammals, including general adaptations to a marine existence; systematics and biogeography; reproduction; diving physiology; communication and echolocation; feeding and migratory behavior; and marine mammal/human interactions; including conservation issues. **CROSSLISTED** as BI 302. Taught at Hatfield Marine Science Center OR online through Ecampus. **PREREQS:** One year of introductory biology is mandatory.

FW 303. SURVEY OF GEOGRAPHIC INFORMATION SYSTEMS IN NATURAL RESOURCE (3). Concepts underlying geographic information systems, global positioning system, and remote sensing; application to management and research, data quality issues, and case studies. Not a lab/skills class.

FW 307. SPECIALIZATION DEVELOPMENT (1). Students will examine career alternatives, develop career goals, learn what knowledge, skills, and abilities are important for diverse careers in fisheries and wildlife conservation, and develop an academic and lifelong plan for achieving their career goals. This course is intended to assist students in developing a specialization in fisheries and wildlife sciences. Graded P/N.

FW 311. ORNITHOLOGY (3). Survey of the adaptations of birds to a diverse array of habitats. Topics include origins, anatomy, reproductive strategies, migration, flight, behavior, physiology, nutrition, and conservation. **PREREQS:** One year introductory biology.

FW 312. SYSTEMATICS OF BIRDS (2). External anatomy, classification of birds of the world, and field identification of birds by sight and song. Field trips required. **PREREQS:** One year introductory biology.

FW 315. ICHTHYOLOGY (3). A survey of the diversity of biological adaptations of fishes. Topics include physiological and zoogeographical adaptations, reproduction, evolution, cladogenesis, morphology, behavior, and genetics. **PREREQS:** One year introductory biology.

FW 316. SYSTEMATICS OF FISHES (3). Phylogenetic diversity, evolution, relationships and identification of the world's fishes, with particular focus on Oregon fishes. Includes identification, anatomy, use of keys, introduction to the comparative method, systematic theory, taxonomy, field collection and specimen curation. **PREREQS:** (BI 211 or BI 211H) and (BI 212 or BI 212H) and (BI 213 or BI 213H) and Recommended pre- or co-requisite: FW 315 Ichthyology.

FW 317. MAMMALOLOGY (3). A survey of the origins, evolution, diversity, and adaptations of mammals to diverse environments. Topics include taxonomy, reproduction, sensory perception, herbivory, population cycles and behavior. **PREREQS:** One year introductory biology.

FW 318. SYSTEMATICS OF MAMMALS (2). A survey of the phylogenetic diversity of the mammals in Oregon from a habitat/community perspective. Identifying, using keys, and measuring specimens will be stressed. **PREREQS:** One year introductory biology.

FW 320. INTRODUCTORY POPULATION DYNAMICS (4). Principles and concepts of population dynamics related to fish and wildlife populations; methods of estimating abundance, mortality, sustainable harvest levels and extinction risk; hands-on introduction to models for population analysis. Lec/lab. **PREREQS:** (BI 370* or BI 370H* or BI 371*) and Recommended: mathematics equivalent to MTH 245 or higher, introductory statistics.

FW 321. APPLIED COMMUNITY AND ECOSYSTEM ECOLOGY (3). Perspectives in community and ecosystem ecology, and their use in management of fisheries and wildlife resource systems. **PREREQS:** FW 320*

FW 323. MANAGEMENT PRINCIPLES OF PACIFIC SALMON IN THE NORTHWEST (3). Explores the nature of the salmon problem in the Northwest. Experts from diverse disciplines describe principles of salmon biology, habitat ecology and management, socioeconomics of direct and indirect users, and government policies.

FW 325. *GLOBAL CRISES IN RESOURCE ECOLOGY (3). Historical and contemporary implications of the impacts of burgeoning human

populations on rates and patterns of global ecological change. Changes in ecosystem processes and crises of species extinction in the context of cultural and political institutions. (Bacc Core Course).

FW 326. INTEGRATED WATERSHED MANAGEMENT (3). A comprehensive approach to watershed management, one that includes biophysical, socioeconomic, planning and education related topics. Intended for students interested in the sustainable management of natural resources. **PREREQS:** FW 251

FW 328. WILDLIFE CAPTURE AND IMMOBILIZATION (2). Manual and chemical restraint methods are covered with an emphasis on darting equipment, animal and human safety, drug pharmacology and species specific recommendations. **CROSSLISTED** as VMB 328. Lec/lab. This course is repeatable for a maximum of 4 credits.

FW 340. *MULTICULTURAL PERSPECTIVES IN NATURAL RESOURCES (3). Explores multicultural influences on development of natural resources in the American West. Effects of diverse social values on changes in the physical landscape and biodiversity. (Bacc Core Course)

FW 341. FISH AND WILDLIFE LAW ENFORCEMENT (2). Introduction to the philosophy, purposes, and methods of enforcing natural resource laws, emphasizing fish and wildlife laws.

FW 346. TOPICS IN WILDLAND FIRE (3). An interdisciplinary survey of concepts relating to fire science, ecology, management, and policy. Includes case studies of several representative ecosystems, ranging from west- and eastside forests of the Pacific Northwest to shrub steppe ecosystems of the Intermountain West and chaparral ecosystems of southern California. Distance and campus-based delivery using videos, website, and discussion. **CROSSLISTED** as FOR 346, RNG 346. **PREREQS:** Course work in forest biology or ecology (e.g. FOR 240, FOR 341) or equivalent.

FW 350. *ENDANGERED SPECIES, SOCIETY AND SUSTAINABILITY (3). Provides a general background to endangered species biology, and the social and economic implications of the legislation enacted to conserve endangered species (Endangered Species Act, CITES Treaty). (Bacc Core Course) **PREREQS:** FW 251

FW 360. *ORIGINS OF F&W MANAGEMENT-EVOLUTION, GENETICS, AND ECOLOGY (3). Examines genetics and human interactions with fisheries and wildlife from an ecological and evolutionary perspective. Basic principles of environmental interactions, and how humans interact with other species and their environments in the disciplines commonly recognized as fisheries, wildlife and conservation sciences. (Baccalaureate Core Course) **PREREQS:** Two terms of course work at OSU or equivalent.

FW 370. CONSERVATION GENETICS (4). Explores the genetic basis of conservation and management issues concerned with populations and species. Genetic techniques used by conservation biologists are reviewed. Applications of genetic information to natural resource problems are investigated. **PREREQS:** BI 211 and BI 212 and BI 213 and/or 1 year introductory biology.

FW 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

FW 403. THESIS (1-16). This course is repeatable for a maximum of 32 credits. **PREREQS:** Departmental approval required.

FW 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

FW 407. SEMINAR (1-16). Graded P/N. Taught at Hatfield Marine Science Center. This course is repeatable for a maximum of 16 credits.

FW 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

FW 410. INTERNSHIP (1-6). This course is repeatable for a maximum of 99 credits.

FW 415. FISHERIES AND WILDLIFE LAW AND POLICY (3). Provides students with an understanding of the key legal frameworks within which they will work to conserve fish and wildlife resources. Examines federal law and policy relating to allocation and conservation of fish and wildlife resources. **PREREQS:** PS 201 or other introductory political science course.

FW 419. THE NATURAL HISTORY OF WHALES AND WHALING (3). Addresses the natural history of whales as a unique example of adaptation in an evolutionary lineage, and the history of whaling as a general example of the failings of international resource management. Taught at HMSC. **PREREQS:** Some background in vertebrate ecology and evolution or genetics is recommended.

FW 421. AQUATIC BIOLOGICAL INVASIONS (4). An overview of the background, theory, evolution, ecology, politics and conservation of invasions by introduced species in aquatic environments. **CROSSLISTED** as BI 421. Taught at Hatfield Marine Science Center OR online through Ecampus. **PREREQS:** One year of university-level biology.

FW 422. INTRODUCTION TO OCEAN LAW (3). Examination of US law and primary international law focused on fisheries management with coverage of regulation of other ocean resources including energy, marine mammals, endangered species, pollution, and protected areas. Final project is intended to provide students with hands-on exposure to real-world fisheries and ocean management issues.

FW 426. COASTAL ECOLOGY AND RESOURCE MANAGEMENT (5). Study of the ecology and management of coastal marine and freshwater ecosystems as well as natural resources, emphasizing experimental (participatory) learning in a field station setting. Lec/lab. Taught at Hatfield Marine Science Center.

FW 427. PRINCIPLES OF WILDLIFE DISEASES (4). Ecological aspects of important diseases affecting North American wildlife will be discussed. Demonstrations will mainly cover migratory birds, carnivores and ruminants. Lec/lab. Ecampus sections do not use lab demonstrations. **PREREQS:** Junior standing or instructor approval required.

FW 431. DYNAMICS OF MARINE BIOLOGICAL RESOURCES (4). Strategies of marine fishery management. A synthesis of the principles of population dynamics for single- and multi-species systems from the viewpoint of a marine resource manager. Offered alternate years. Taught at Hatfield Marine Science Center OR online through Ecampus. **PREREQS:** BI 370 or BI 371

FW 435. ^WILDLIFE IN AGRICULTURAL ECOSYSTEMS (3). Examines the relationships between agricultural production and fish and wildlife populations and communities. Explores the impacts of agricultural practices on fish and wildlife. Field trips required; transportation fee charged. OSU Ecampus students are not required to attend field trips. (Writing Intensive Course) **PREREQS:** BI 370 and FW 251

FW 439. ^HUMAN DIMENSIONS OF FISHERIES AND WILDLIFE MANAGEMENT (3). Students build an understanding and appreciation for the role of human dimensions (HD) in fisheries and wildlife management. Students work both independently and in groups on assignments with an HD focus. **CROSSLISTED** as FES 439 (Writing Intensive Course) **PREREQS:** Principles of fish and wildlife conservation or natural resources and introductory statistics.

FW 445. ECOLOGICAL RESTORATION (4). Fundamentals of restoring and reclaiming

disturbed landscapes and ecosystems. Topics to be covered include types and assessment of site conditions; determining restoration goals and feasibility; hydrologic, biotic, and soil functions and their importance in restoration; and measures of successful restoration. Lec/lab/rec. **CROSSLISTED** as FES 445. **PREREQS:** BI 370 or instructor approval required.

FW 446. WILDLAND FIRE ECOLOGY (3). Coverage of fire histories and ecology of major forest, rangeland and wetland ecosystems. Includes fire interactions with physical and biotic components of ecosystems, role of fire in ecological processes, and utilization in natural resource management. **CROSSLISTED** as FOR 446/FOR 546 and RNG 446/RNG 546. **PREREQS:** Course work in ecology and natural resource management.

FW 451. AVIAN CONSERVATION AND MANAGEMENT (3). Identification, classification, life history strategies, ecology and management of upland and migratory birds. **PREREQS:** FW 311

FW 453. FOREST MANAGEMENT AND WILDLIFE CONSERVATION (3). The ecology and conservation of wildlife in managed forests, the influences of forest management on wildlife and their habitats, and management of forests to achieve wildlife objectives. Field trips required. **CROSSLISTED** as FS 453. **PREREQS:** (FOR 240* or FOR 341* or (BI 370* or BI 370H*)) and / or equivalent course in ecology.

FW 454. ^FISHERY BIOLOGY (4). Principles and methods used in studying the biology of fishes; ecological requirements of freshwater and anadromous fishes; principles and practices in sport fishery management. Taught at Hatfield Marine Science Center OR online through Ecampus. (Writing Intensive Course) **PREREQS:** (FW 315 and FW 320)

FW 456. LIMNOLOGY (5). Physical, chemical, and biological concepts in limnology and techniques related to aquatic resources and their management. Lec/lab. **PREREQS:** Senior standing.

FW 458. MAMMAL CONSERVATION AND MANAGEMENT (4). A thorough understanding of the management, conservation, and ecology of mammals in North America; includes population dynamics, harvest management, techniques to determine abundance, diets, reproduction, and the cultural and political variables that contribute to formulation of management programs. **PREREQS:** 9 credits of upper-division biological sciences.

FW 462. ECOSYSTEM SERVICES (3). Introduces students to the ecological, economic, and social/ethical issues involved in the study of ecosystem services, with a major focus on biological components involved in ecosystem services. Topics covered include: 1) an introduction to the roles that living organisms play in the provision of ecosystem services, 2) the relationship of ecosystem functions and services, 3) the societal factors that influence this relationship, 4) general categories of ecosystem services, 5) identification of potential ecosystem services in terrestrial and aquatic systems, 6) an overview of the methods of valuation, and 7) translating ecosystems functions to services. Case studies will be used to illustrate key concepts and relationships within different ecological and social contexts. **PREREQS:** BI 370

FW 464. MARINE CONSERVATION BIOLOGY (3). Lectures, group library research, and class debates on current issues regarding the conservation of biodiversity in the sea. Topics include overfishing, invasive species, eutrophication, marine pollution, and global warming, as well as means of addressing these threats. **CROSSLISTED** as Z 464/Z 564. **PREREQS:** (BI 370 or BI 370H) and / or equivalent. Seniors, postbacs, and graduate students only.

FW 465. MARINE FISHERIES (4). A global perspective on commercial fish and shellfish

harvesting with emphasis on fishing technology and policy issues. Offered alternate years. Taught at Hatfield Marine Science Center. **PREREQS:** FW 315

FW 467. ANTARCTIC SCIENCE AND CONSERVATION (4). Explores the history, geology, climate, and ecosystems of Antarctica, with special emphasis on current conservation issues. **PREREQS:** Upper-division standing; BI 370 or equivalent recommended.

FW 470. ^ECOLOGY AND HISTORY: LANDSCAPES OF THE COLUMBIA BASIN (3). Integrates environmental history and landscape ecology of the Columbia River Basin from geologic origins to the present, to create an understanding of change caused by natural processes and human activities. **CROSSLISTED** as HSTS 470/HSTS 570. (Bacc Core Course) **PREREQS:** (HST 201 and HST 202 and HST 203) or BI 370

FW 471. ENVIRONMENTAL PHYSIOLOGY OF FISHES (4). Principles of the functional biology of fishes with emphasis on environmental interactions and management implications. **PREREQS:** FW 315 and (BI 370 or BI 371)

FW 472. ADVANCED ICHTHYOLOGY (3). Evolution of fishes with emphasis on the role of ontogeny; cladistic methodology and classification contrasted with traditional taxonomic approaches. **PREREQS:** Two years upper-division fisheries or zoology.

FW 473. FISH ECOLOGY (4). Behavior of fishes as a mode of accommodation to various ecological and evolutionary constraints. Importance of heritable and learned patterns to population and community dynamics. Application of behavioral studies to the solution of management problems. Lec/lab/rec. **PREREQS:** ((BI 370 or BI 370H) and FW 315)

FW 474. EARLY LIFE HISTORY OF FISHES (4). Overview of diversity of development patterns in fishes; emphasis on morphology, life history, and evolution. Offered alternate years. **PREREQS:** FW 315 or equivalent.

FW 475. WILDLIFE BEHAVIOR (4). Adaptive significance of egocentric and social behavior of wildlife species. Implications of behavior in sound management practice. **PREREQS:** 9 credits of upper-division biology.

FW 476. FISH PHYSIOLOGY (4). Physiological specializations and adaptations of major groups of fishes. **PREREQS:** FW 315

FW 477. AGE AND GROWTH OF FISH (3). An overview of the terminology, theory, assumptions, limitations, error, and processing and ageing techniques for different types of calcified structures used to age fishes. **PREREQS:** FW 454 and introductory statistics is highly recommended.

FW 479. WETLANDS AND RIPARIAN ECOLOGY (3). Ecology of riparian freshwater and estuarine wetlands of the Pacific Northwest. Effects of land use on ecosystem structure, function, biodiversity, and restoration will be explored. **PREREQS:** BI 370 or BI 371

FW 481. WILDLIFE ECOLOGY (4). Interrelationships of wildlife, environment and humans. Evaluation of properties and habitats of wildlife populations. **PREREQS:** (BI 370 or BI 370H or BI 371) and FW 311 and FW 320 and ST 351

FW 485. ^CONSENSUS AND NATURAL RESOURCES (3). Students will use a working group approach. They will select a natural resource topic, study the team process and interaction as a method of learning, explore the issue using systems practice, and strive for consensus on solutions to their issue. **CROSSLISTED** as ANS 485/ANS 585, FES 485/FES 585, FS 485/FS 585, SOC 485/SOC 585. (Bacc Core Course)

FW 488. PROBLEM SOLVING IN FISHERIES AND WILDLIFE SCIENCE (3). The first of a two-

course capstone sequence designed to introduce students to the synthesis of scientific information on species, habitats and ecosystems and the use of such data in shaping fisheries and wildlife conservation, management and policy. Includes a group problem solving project and case studies. For FW majors in their senior year. Lec/lab. **PREREQS:** (FW 320 and FW 321*) and 400-level FW course work (e.g. FW 454 or FW 481 or FW 426)

FW 489. EFFECTIVE COMMUNICATIONS IN FISHERIES AND WILDLIFE SCIENCE (3). Second of a two-course capstone sequence centered on analysis, synthesis, and interpretation of data and written and oral communication of management, education or policy statements. **PREREQS:** FW 488

FW 491. FISH DISEASES IN CONSERVATION BIOLOGY AND AQUACULTURE (4). Introduction to diseases of fish including pathogens important to aquaculture and ornamental industries as well as to wild fish populations and conservation programs. Lec/lab. **CROSSLISTED** as MB 491/MB 591. **PREREQS:** 9 credits of upper-division fisheries biology.

FW 497. AQUACULTURE (3). Principles and practices for the aquaculture of fish, shellfish, and algae. Taught at Hatfield Marine Science Center. (Writing Intensive Course.) **PREREQS:** 9 credits of upper-division biology.

FW 498. AQUACULTURE LABORATORY (3). Biology and culture requirements of fish, shellfish, and algae. Emphasis on laboratory culture techniques and practical experience in handling organisms. Taught at Hatfield Marine Science Center. **PREREQS:** 9 credits of upper-division biology.

FW 499. SPECIAL TOPICS IN FISHERIES AND WILDLIFE (1-16). Various topics in fisheries science and wildlife science. Taught at Hatfield Marine Science Center and Corvallis campus. This course is repeatable for a maximum of 16 credits.

FW 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

FW 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

FW 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

FW 506. PROJECTS (1-6). Projects are synthesis papers or outreach products that are developed with a mentor from campus, a natural resource agency, or the student's place of employment. The purpose of your project is to contribute to the field of study with a product that reflects the principles and applications learned in your classes. Graded P/N. This course is repeatable for a maximum of 12 credits.

FW 507. SEMINAR (1-16). Selected Topics. Taught at Hatfield Marine Science Center and Corvallis campus. This course is repeatable for a maximum of 16 credits.

FW 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

FW 510. PROFESSIONAL INTERNSHIP (1-16). This course is repeatable for a maximum of 10 credits.

FW 514. PROFESSIONAL DEVELOPMENT: MEETING COMMUNICATIONS (1). Fisheries and wildlife professionals use meetings of scientists, managers and stakeholders to communicate key findings and develop consensus recommendations for policy. This 1-credit experiential learning course will expose students to a scientific or management meeting in their chosen field (fisheries, wildlife, ecology, or conservation biology) and get them to think about how meetings function as well as their content. This course is repeatable for a maximum of 3 credits.

FW 515. FISHERIES AND WILDLIFE LAW AND POLICY (3). Provides students with an understanding of the key legal frameworks within which they will work to conserve fish and wildlife resources. Examines federal law and policy relating to allocation and conservation of fish and wildlife resources. **PREREQS:** PS 201 or other introductory political science course.

FW 519. THE NATURAL HISTORY OF WHALES AND WHALING (3). Addresses the natural history of whales as a unique example of adaptation in an evolutionary lineage, and the history of whaling as a general example of the failings of international resource management. Taught at HMSC. **PREREQS:** Some background in vertebrate ecology and evolution or genetics is recommended.

FW 520. ECOLOGY AND MANAGEMENT OF MARINE FISHES (3). A lecture and lab course that covers the ecology of marine fishes and important ecological principles that guide conservation and management. Life history, behavior, habitat, community dynamics and ecosystem processes are emphasized, along with alternative management strategies. **PREREQS:** FW 320 or equivalent population dynamics class and ichthyology.

FW 521. AQUATIC BIOLOGICAL INVASIONS (4). An overview of the background, theory, evolution, ecology, politics and conservation of invasions by introduced species in aquatic environments. Taught at Hatfield Marine Science Center OR online through Ecampus. **PREREQS:** One year of university-level biology.

FW 522. INTRODUCTION TO OCEAN LAW (3). Examination of US law and primary international law focused on fisheries management with coverage of regulation of other ocean resources including energy, marine mammals, endangered species, pollution, and protected areas. Final project is intended to provide students with hands-on exposure to real-world fisheries and ocean management issues.

FW 524. INTRODUCTION TO FISHERIES ASSESSMENT (3). Fisheries management strategies rely on models that predict a population's responses to exploitation. This course introduces approaches commonly used to assess and evaluate the dynamics and status of a population. Provides an overview of the terminology, data requirements, underlying rationale, assumptions, limitations and uncertainty associated with stock assessments. **PREREQS:** College algebra and introductory statistics are recommended. For those unfamiliar with data collection and analysis methods in fisheries, FW 454/554, Fishery Biology, is a good precursor to this course.

FW 526. COASTAL ECOLOGY AND RESOURCE MANAGEMENT (5). Study of the ecology and management of coastal marine and freshwater ecosystems as well as natural resources, emphasizing experimental (participatory) learning in a field station setting. Lec/lab. Taught at Hatfield Marine Science Center.

FW 527. PRINCIPLES OF WILDLIFE DISEASES (4). Ecological aspects of important diseases affecting North American wildlife will be discussed. Demonstrations will mainly cover migratory birds, carnivores and ruminants. Lec/lab. Ecampus sections do not use lab demonstrations. **PREREQS:** Junior standing or instructor approval required.

FW 531. DYNAMICS OF MARINE BIOLOGICAL RESOURCES (4). Strategies of marine fishery management. A synthesis of the principles of population dynamics for single- and multi-species systems from the viewpoint of a marine resource manager. Offered alternate years. Taught at Hatfield Marine Science Center OR online through Ecampus. **PREREQS:** BI 370 or BI 371

FW 535. WILDLIFE IN AGRICULTURAL ECOSYSTEMS (3). Examines the relationships

between agricultural production and fish and wildlife populations and communities. Explores the impacts of agricultural practices on fish and wildlife. Field trips required; transportation fee charged. OSU Ecampus students are not required to attend field trips. **PREREQS:** BI 370 and FW 251

FW 537. STRUCTURED DECISION MAKING IN NATURAL RESOURCE MANAGEMENT (2). Structured decision making (SDM) is used for making natural resource management and policy decisions. It is an ideal framework for interdisciplinary teams to cooperate and identify the most effective management strategies. Graduate students from diverse backgrounds (natural resources, political science, others) are provided with an understanding of the SDM process. **PREREQS:** One year of college-level mathematics, one quarter of fish and wildlife management or similar course is recommended.

FW 538. STRUCTURED DECISION MAKING IN NATURAL RESOURCE MGMT LAB (2). Students who are taking or have taken FW 537 are provided with the understanding of and ability to employ the techniques needed to build models that are used during the structured decision-making process. The laboratory emphasizes the use of graphical models and basic statistical techniques for building decision-making models. Lec/lab. **PREREQS:** FW 537*

FW 540. VERTEBRATE POPULATION DYNAMICS (4). Concepts in population ecology and quantitative approaches to managing wildlife populations; methods of parameter estimation, model structure, assumptions, and analysis, applications to common management issues. **PREREQS:** Upper-division population ecology and basic statistics courses expected.

FW 542. PHYSIOLOGICAL ECOLOGY OF WILDLIFE (4). An overview of the energy and nutrient requirements of wildlife; fundamental methods and techniques for research; energetic and nutritional constraints for wildlife, and adaptations to these constraints as they relate to wildlife management.

FW 544. QUANTITATIVE DECISION ANALYSIS FOR FISH AND WILDLIFE MGMT (4). Decision analysis allows decision makers to examine the expected effects of different strategies before implementation; incorporate multiple objectives and values of stakeholders; determine the relative influence of various sources of uncertainty; and estimate the value of collecting additional data. Quantitatively oriented graduate students in natural resources are provided with an in-depth overview of decision analysis and adaptive management, emphasizing animal population management. Lec/lab. **PREREQS:** ST 511 and ST 512 or equivalent, basic background in animal population dynamics and management.

FW 545. ECOLOGICAL RESTORATION (4). Fundamentals of restoring and reclaiming disturbed landscapes and ecosystems. Topics to be covered include types and assessment of site conditions; determining restoration goals and feasibility; hydrologic, biotic, and soil functions and their importance in restoration; and measures of successful restoration. **CROSSLISTED** as FES 545. **PREREQS:** BI 370 or instructor approval required.

FW 546. WILDLAND FIRE ECOLOGY (3). Coverage of fire histories and ecology of major forest, rangeland and wetland ecosystems. Includes fire interactions with physical and biotic components of ecosystems, role of fire in ecological processes, and utilization in natural resource management. **CROSSLISTED** as FOR 446/FOR 546 and RNG 446/RNG 546. **PREREQS:** Course work in ecology and natural resource management.

FW 547. TROPHIC CASCADES (2-3). Theory and empirical analysis of terrestrial carnivore effects on plants and ecosystems as mediated through herbivores. Emphasis on large carnivores,

frequency/strength of trophic cascades, implications for ecosystem function, management, and restoration. Lectures, current literature, discussions, field exercise, term paper, and student presentations. Offered every odd year in spring. **CROSSLISTED** as FOR 547. **PREREQS:** Graduate or post-bac standing and an ecology course.

FW 551. AVIAN CONSERVATION AND MANAGEMENT (3). Identification, classification, life history strategies, ecology and management of upland and migratory birds. **PREREQS:** FW 311

FW 553. FOREST WILDLIFE HABITAT MANAGEMENT (4). Management of terrestrial vertebrates in forest ecosystems. Effects on silvicultural practices and landscape pattern on habitats and populations. **CROSSLISTED** as FS 553. **PREREQS:** FOR 341 or equivalent course in ecology.

FW 554. FISHERY BIOLOGY (4). Principles and methods used in studying the biology of fishes; ecological requirements of freshwater and anadromous fishes; principles and practices in sport fishery management. Taught at Hatfield Marine Science Center OR online through Ecampus. **PREREQS:** FW 315 and FW 320

FW 556. LIMNOLOGY (5). Physical, chemical, and biological concepts in limnology and techniques related to aquatic resources and their management. Lec/lab. **PREREQS:** Senior standing.

FW 558. MAMMAL CONSERVATION AND MANAGEMENT (4). A thorough understanding of the management, conservation, and ecology of mammals in North America; includes population dynamics, harvest management, techniques to determine abundance, diets, reproduction, and the cultural and political variables that contribute to formulation of management programs. **PREREQS:** 9 credits of upper-division biological sciences.

FW 562. ECOSYSTEM SERVICES (3). Introduces students to the ecological, economic, and social/ethical issues involved in the study of ecosystem services, with a major focus on biological components involved in ecosystem services. Topics covered include: 1) an introduction to the roles that living organisms play in the provision of ecosystem services, 2) the relationship of ecosystem functions and services, 3) the societal factors that influence this relationship, 4) general categories of ecosystem services, 5) identification of potential ecosystem services in terrestrial and aquatic systems, 6) an overview of the methods of valuation, and 7) translating ecosystems functions to services. Case studies will be used to illustrate key concepts and relationships within different ecological and social contexts. **PREREQS:** BI 370

FW 563. CONSERVATION BIOLOGY OF WILDLIFE (3). Overview of the field of conservation biology with emphasis on the relationship to conservation and management of wildlife.

FW 564. MARINE CONSERVATION BIOLOGY (3). Lectures, group library research, and class debates on current issues regarding the conservation of biodiversity in the sea. Topics include overfishing, invasive species, eutrophication, marine pollution, and global warming, as well as means of addressing these threats. **CROSSLISTED** as Z 464/Z 564. **PREREQS:** BI 370 or BI 370H or equivalent. Seniors, postbacs, and graduate students only.

FW 565. MARINE FISHERIES (4). A global perspective on commercial fish and shellfish harvesting with emphasis on fishing technology and policy issues. Offered alternate years. Taught at Hatfield Marine Science Center. **PREREQS:** FW 315

FW 570. ECOLOGY AND HISTORY: LANDSCAPES OF THE COLUMBIA BASIN (3). Integrates environmental history and landscape ecology of the Columbia River Basin from geologic origins to the present, to create an understanding

of change caused by natural processes and human activities. **CROSSLISTED** as HSTS 470/HSTS 570. **PREREQS:** (HST 201 and HST 202 and HST 203) or BI 370

FW 571. ENVIRONMENTAL PHYSIOLOGY OF FISHES (4). Principles of the functional biology of fishes with emphasis on environmental interactions and management implications. **PREREQS:** FW 315 and (BI 370 or BI 371)

FW 572. ADVANCED ICHTHYOLOGY (3). Evolution of fishes with emphasis on the role of ontogeny; cladistic methodology and classification contrasted with traditional taxonomic approaches. **PREREQS:** Two years upper-division fisheries or zoology.

FW 573. FISH ECOLOGY (4). Behavior of fishes as a mode of accommodation to various ecological and evolutionary constraints. Importance of heritable and learned patterns to population and community dynamics. Application of behavioral studies to the solution of management problems. Lec/lab/rec. **PREREQS:** BI 370 and FW 315

FW 574. EARLY LIFE HISTORY OF FISHES (4). Overview of diversity of development patterns in fishes; emphasis on morphology, life history, and evolution. Offered alternate years. **CROSSLISTED** as OC 574. **PREREQS:** FW 315 or equivalent.

FW 575. WILDLIFE BEHAVIOR (4). Adaptive significance of egocentric and social behavior of wildlife species. Implications of behavior in sound management practice. **PREREQS:** 9 credits of upper-division biology.

FW 576. FISH PHYSIOLOGY (4). Physiological specializations and adaptations of major groups of fishes. **PREREQS:** FW 315

FW 577. AGE AND GROWTH OF FISH (3). An overview of the terminology, theory, assumptions, limitations, error, and processing and ageing techniques for different types of calcified structures used to age fishes. **PREREQS:** Introductory statistics is highly recommended. Graduate students: FW 554, Fishery Biology, is highly recommended.

FW 579. WETLANDS AND RIPARIAN ECOLOGY (3). Ecology of riparian freshwater and estuarine wetlands of the Pacific Northwest. Effects of land use on ecosystem structure, function, biodiversity, and restoration will be explored. **PREREQS:** BI 370 or BI 371

FW 580. STREAM ECOLOGY (3). Structure and function of stream ecosystems, with emphasis on biological processes; physical and chemical relations; riparian influences and landscape perspectives. **PREREQS:** 9 credits of upper-division science.

FW 581. WILDLIFE ECOLOGY (4). Interrelationships of wildlife, environment and humans. Evaluation of properties and habitats of wildlife populations. **PREREQS:** (BI 370 or BI 371) and FW 311 and FW 320 and ST 351

FW 585. CONSENSUS AND NATURAL RESOURCES (3). Students will use a working group approach. They will select a natural resource topic, study the team process and interaction as a method of learning, explore the issue using systems practice, and strive for consensus on solutions to their issue. **CROSSLISTED** as ANS 485/ANS 585, FES 485/FES 585, FS 485/FS 585, SOC 485/SOC 585.

FW 586. GENETICS AND DEMOGRAPHY OF SMALL POPULATIONS (3). Factors affecting species persistence, viability models, and implications for conservation. Offered alternate years. **PREREQS:** Ecology and genetics

FW 590. COASTAL POPULATION GENETICS AND CONSERVATION (6). Hands-on application of molecular population genetics in coastal fishery management and conservation, study design, DNA extraction, PCR, analysis techniques, paper review and write-up. Taught at Hatfield Marine Science Center. **PREREQS:** BI 311 or equivalent introductory genetics course.

FW 591. FISH DISEASES IN CONSERVATION BIOLOGY AND AQUACULTURE (4). Introduction to diseases of fish including pathogens important to aquaculture and ornamental industries as well as to wild fish populations and conservation programs. Lec/lab. **CROSSLISTED** as MB 491/MB 591. **PREREQS:** 9 credits of upper-division fisheries biology.

FW 597. AQUACULTURE (3). Principles and practices for the aquaculture of fish, shellfish, and algae. Taught at Hatfield Marine Science Center. **PREREQS:** 9 credits of upper-division biology.

FW 598. AQUACULTURE LABORATORY (3). Biology and culture requirements of fish, shellfish, and algae. Emphasis on laboratory culture techniques and practical experience in handling organisms. Taught at Hatfield Marine Science Center. **PREREQS:** 9 credits of upper-division biology.

FW 599. SPECIAL TOPICS IN FISHERIES AND WILDLIFE (1-16). Various topics in fisheries science and wildlife science. Taught at Hatfield Marine Science Center and Corvallis campus. This course is repeatable for a maximum of 99 credits.

FW 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

FW 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

FW 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

FW 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

FW 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

FW 620. ECOLOGICAL POLICY (3). Policy issues associated with ecosystem management, risk assessment, biological diversity, ecosystem health, sustainability, invasive species, bioregionalism, globalization and transnational factors, and rights, ethics, and morals. **PREREQS:** Background in natural resources, environmental sciences, ecological sciences, ecological economics, political science, or similar discipline.

FW 661. ANALYSIS OF ANIMAL POPULATIONS (5). Quantitative methods for estimating parameters (abundance, survival, population stability) of animal populations. Emphasis is on vertebrate animals and statistical methods of hypothesis testing, parameter estimation, and inference testing. Offered odd-numbered years. **PREREQS:** ST 511 and ST 512 or equivalent

FW 667. RESEARCH PERSPECTIVES (4). Critical evaluation of philosophical perspectives in resource science and management. The aim of the course is to help students develop their own philosophical views through discussion of dominant perspectives and their problems and suggestion of potentially more adequate views. **PREREQS:** 9 credits of upper-division science, philosophy or natural resources.

FW 699. SPECIAL TOPICS IN FISHERIES AND WILDLIFE (1-4). Various topics in fisheries science and wildlife science. Taught at Hatfield Marine Science Center and Corvallis campus. This course is repeatable for a maximum of 8 credits.

FW 808. WORKSHOP (1-16).

FOOD SCIENCE AND TECHNOLOGY

Robert J. McGorin, *Head*
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FACULTY

Professors Daeschel, Goddik, McGorin, Morrissey, Park, Qian, Shay, Shellhammer, Zhao
Associate Professors Bakalinsky, DeWitt, Osborne, Penner, Ross, Su, Torres
Assistant Professors Lim, Tomasino, Waite-Cusic
Senior Instructor Smith

Undergraduate Major

Food Science and Technology
(BS, CRED, HBS)

Options

Enology and Viticulture
Fermentation Science
Food Science

Minors

Fermentation Science
Food Science
Food Technology

Graduate Major

Food Science and Technology
(MAg, MS, PhD)

Graduate Areas of Concentration

Brewing
Enology
Flavor Chemistry
Food Chemistry/Biochemistry
Food Engineering
Food Microbiology/Biotechnology
Food and Seafood Processing
Sensory Evaluation

Graduate Minor

Food Science and Technology

Food science and technology concerns the chemistry and engineering necessary to deliver safe, convenient food products from the farm gate to the food marketer. The academic program integrates principles and concepts in the physical, biological, and engineering sciences, and applies them to the scientific and technological aspects of food and beverage processing. The role of the food scientist is to successfully integrate these disciplines to assure an abundant, high quality, and nutritious food supply.

Graduate programs leading to the MAg, MS, or PhD degree in food science

permit intensified study in subject areas of special interest. Research areas in the department include both basic and applied aspects of chemistry/biochemistry, microbiology/biotechnology, sensory analysis, and food engineering. Research in food processing operations covers a number of food commodities such as cereal products, dairy products, fruits, vegetables, meats, seafoods, wines and beers.

Departmental facilities include well-equipped laboratories, a pilot plant, a winery, a micro-brewery, and an artisan cheese-making plant for instruction and research. Research facilities also are available at the Coastal Oregon Marine Experiment Station Seafood Laboratory at Astoria and the Food Innovation Center in Portland, Oregon.

WORK EXPERIENCE AND INTERNSHIPS

Because of the educational value of professional work experience, the department strongly encourages students to gain practical work experience during summer and fall terms. Students typically work in brewing, wineries, dairy processing, and seasonal fruit and vegetable processing. Students may earn internship credit with prior approval of the department and of the employer. OSU students may also participate in international internship programs.

SCHOLARSHIPS

The College of Agricultural Sciences, the department, the food industry, and the Institute of Food Technologists offer over 25 merit and financial need scholarships to encourage students preparing for careers in the food industry. For more information, contact the department, 541-737-3131, and the Office of Financial Aid and Scholarships, 541-737-2241.

CAREER OPPORTUNITIES

Food science graduates have had excellent success in finding positions (median nationwide entry level salary for bachelor of science degree holders is \$50,000) in an industry that possesses tremendous variety, mobility and opportunity for advancement. Career opportunities in the food, brewing, and enology industries include management, research and development, process and production supervision, quality assurance, distribution, sales, marketing, consulting, and trade associations. Governmental agencies employ food scientists for work in regulatory control, research, and the development of food standards.

Graduates of a master's or doctoral program hold teaching, research and extension positions with colleges and universities.

FOOD SCIENCE AND TECHNOLOGY (BS, CRED, HBS)

A bachelor's degree in Food Science and Technology provides the necessary foundation to pursue any of the many possible food and beverage related career paths. The program integrates principles and concepts in the physical, biological and engineering sciences (including courses in general chemistry, organic chemistry, biology, physics, math and statistics, biochemistry, microbiology, and food engineering) and applies them to the scientific and technical aspects of food and beverage processing. Students who achieve at least a 2.00 GPA in the required foundation courses in chemistry additionally earn a Chemistry minor.

In addition to completing the Food Science and Technology Core, students select from among three options (areas of concentration):

1. Enology and Viticulture
2. Fermentation Science
3. Food Science

All curricula are approved by the Higher Education Committee of the Institute of Food Technologists, making students eligible for national and Oregon IFT scholarships, as well as providing universal degree recognition within the food industry. Beyond choosing an option, students are able to further customize their studies through a menu of elective credits, facilitating the development of additional expertise in food related areas such as microbiology, toxicology, nutrition, horticulture, and animal sciences, and crediting formalized career and professional development experiences. Among minors that complement the Food Science and Technology major are Business and Entrepreneurship, Microbiology, and Nutrition.

Grade Requirements

1. All courses required for completion of the FST major must be passed, graded on the A–F scale. Included are both “core” and “option” courses in FST, as well as supporting courses in math, sciences, and written and oral communication.
2. A C– grade, or better, must be earned in the specified prerequisites for the following courses. (These courses have additional prerequisites, but the C– minimum applies to the prerequisites listed below).
 - a. BEE 472: MTH 112 and (MTH 241 or MTH 251) and PH 201
 - b. FST 420: ST 351
 - c. FST 422: CH 331 and CH 332
 - d. FST 460: BI 212 and CH 331 and CH 332
 - e. FST 466: BI 212 and CH 331 and CH 332
 - f. FST 479: BI 212 and CH 331 and CH 332

3. Students must earn at least a 2.00 "major" GPA. The major GPA is a cumulative GPA calculated on a list of courses particular to each option. Selected core and option courses are included, as specified in the list accompanying requirements of each option.

Food Science and Technology Core (65–69 credits)

Chemistry/Biochemistry Foundation Courses

- BB 350. Elementary Biochemistry (4)
 CH 231, CH 232, CH 233. *General Chemistry (4,4,4)
 CH 261, CH 262, CH 263. *Laboratory for Chemistry 231–233 (1,1,1)
 CH 324. Quantitative Analysis (4)
 CH 331, CH 332. Organic Chemistry (4,4)
 CH 337. Organic Chemistry Laboratory (4)

Physics, Statistics and Mathematics Foundation Courses

- PH 201. *General Physics (5)
 ST 351. Introduction to Statistical Methods (4)

Select either MTH 241 or (MTH 251 and MTH 252):

- MTH 241. *Calculus for Management and Social Science (4)
 or MTH 251. *Differential Calculus (4) and MTH 252. Integral Calculus (4)

Biological Science Foundation Courses

- BI 211. *Principles of Biology (4)
 BI 212. *Principles of Biology (4)
 BI 213. *Principles of Biology (4)
 MB 302. General Microbiology (3)
 MB 303. General Microbiology Laboratory (2)

Communication Foundation Courses

- COMM 111. *Public Speaking (3)

Select one of WR 222, WR 327 or WR 362:

- WR 222. *English Composition (3)
 WR 327. *Technical Writing (3)
 WR 362. *Science Writing (3)

Food Science and Technology Core Courses

- BEE 472. Introduction to Food Engineering Principles (5)
 BEE 473. Introduction to Food Engineering Process Design (3)
 FST 360. Food Safety and Sanitation (3)
 FST 370. Industry Preparation/HACCP (3)
 FST 407. Senior Seminar (1)
 FST 421. *Food Law (3)
 FST 422. Food Chemistry Fundamentals (4)
 FST 425. ^Food Systems Chemistry (4)

Footnotes:

- * Baccalaureate Core Course
 ^ Writing Intensive Course
 A C– or better grade is required in the following courses: BI 212, CH 331–CH 332, MTH 112, MTH 241 or MTH 251, PH 201 and ST 351.

POSTBACCALAUREATE STUDY IN FST

Admission

Students holding a bachelor's degree from an accredited institution who are otherwise admissible to Oregon State

University (see: <http://oregonstate.edu/admissions/main/post-baccalaureate>) will be accepted into the Food Science and Technology major upon meeting the following additional criteria:

All of the following courses (or equivalents) must be completed with a cumulative GPA of 2.25 (4.00 maximum scale). In the case of repeated courses, the second grade earned in the course will be used in the GPA calculation.

- BI 211–BI 213 Principles of Biology
- CH 231–CH 233 General Chemistry and CH 261–CH 263 General Chemistry Laboratory
- MTH 111 College Algebra; MTH 112 Elementary Functions and MTH 241 Calculus for Management and Social Science or MTH 251 Differential Calculus
- PH 201 General Physics

Earning the Degree

To earn a Bachelor of Science (BS) degree in Food Science and Technology, postbaccalaureate students must fulfill all of the FST major requirements, selecting any one of three options: Enology and Viticulture, Fermentation Science, or Food Science (see: <http://oregonstate.edu/foodsci/prospective-undergraduate-students>).

The Baccalaureate Core (general studies) component of an OSU bachelor's degree is considered fulfilled by the student's first degree. Additionally, the university requires that a minimum of 45 credits applied to this degree (32 if the first degree is from OSU) must be completed with Oregon State University course work completed while enrolled in this degree program.

Additional information for prospective postbaccalaureate students is available at the FST undergraduate department website: <http://oregonstate.edu/foodsci/home>.

OPTIONS

ENOLOGY AND VITICULTURE OPTION

The wine industry in the United States is centered on the West Coast, which produces about 95 percent of our nation's wines. Oregon is third in the nation in terms of number of wineries and fourth in the nation in total volume of wine produced. The Oregon wine industry is a rapidly growing industry, and is becoming increasingly important to the larger Oregon economy.

The Enology and Viticulture option within the Department of Food Science and Technology prepares students to become successful winemakers. Courses in enology, taught by food science faculty, provide a scientifically-based understanding of wine production. Supporting course work in horticulture, botany and crop and soil science, helps

students develop an understanding of the interaction between grape production and winemaking. Graduates in this option will possess the necessary breadth and depth of knowledge and associated practical skills to become independently thinking and successful winemakers.

Fermentation and Enology Courses

- FST 466. Wine Production Principles (3)
 FST 467. Wine Production, Analysis, and Sensory Evaluation (5)
 FST/MB 479. Fermentation Microbiology (3)

Plant and Soil Science Courses

- BOT 331. Plant Physiology (4)
 HORT 301. The Biology of Horticulture (3)
 HORT 453. Grapevine Growth and Physiology (3)
 HORT 454. Principles and Practices of Vineyard Production (3)
 SOIL 205. *Soil Science (4)

Enology and Viticulture Option Electives

Complete 12 credits, at least 3 of which must be upper division, from the list below:

- AG 407. Seminar: "Leadership Academy" (3)¹
 BOT 350. Introductory Plant Pathology (4)
 ENT 311. Introduction to Insect Pest Management (4)
 FST 101. Food Science Orientation (1)
 FST 251. Introduction to Wines, Beers, and Spirits (3)
 FST 260. *Food Science and Technology in Western Culture (3)
 FST 273. *Wine in the Western World (3)
 FST 401. Research (3)¹
 FST 410. Internship (3)^{1,2}
 FST 420. Sensory Evaluation of Food (4)
 FST 430. Innovation and Food Product Development (4)
 FST 480. Topics in Fermentation (1) (up to 2 credits of FST480 may be applied)
 HORT 251. Temperate Tree Fruit, Berries, Grapes and Nuts (2)
 HORT 316. Plant Nutrition (4)
 HORT 452. Berry and Grape Physiology and Culture (4)
 MB 440. Food Microbiology (3)
 MB 441. Food Microbiology Laboratory (2)
 NUTR 216. *Food in Non-Western Culture (3)
 TOX 429. Toxic Substances in Food (3)

Total=40

Footnotes:

- * Baccalaureate Core Course
¹ Competitive selection and/or departmental approval required.
² Students may not earn internship credit in all states. Consult with internship coordinator for list of eligible states.
 Students may complete more than one option. Courses must be selected so that at least 12 credits in each option are counted uniquely toward requirements of that option.

FST Major Requirement of 2.00 GPA (Enology and Viticulture Option)

The following courses are included in calculation of the FST major GPA for students in the Enology and Viticulture option:

- BB 350. Elementary Biochemistry (4)

BEE 472. Introduction to Food Engineering Principles (5)
 BEE 473. Introduction to Food Engineering Process Design (3)
 BOT 331. Plant Physiology (4)
 CH 324. Quantitative Analysis (4)
 FST 360. Food Safety and Sanitation (3)
 FST 370. Industry Preparation/HACCP (3)
 FST 407. Senior Seminar (1)
 FST 421. *Food Law (3)
 FST 422. Food Chemistry Fundamentals (4)
 FST 425. *Food Systems Chemistry (4)
 FST 466. Wine Production Principles (3)
 FST 467. Wine Production, Analysis and Sensory Evaluation (5)
 FST 479. Fermentation Microbiology (3)
 HORT 453. Grapevine Growth and Physiology (3)
 HORT 454. Principles and Practices of Vineyard Production (3)
 MB 302. General Microbiology (3)
 MB 303. General Microbiology Laboratory (2)

Plus any of the following utilized in fulfillment of option requirements:
 AG 407. Seminar: Leadership Academy (up to 3 credits)
 BOT 350. Introductory Plant Pathology (4)
 ENT 311. Introduction to Insect Pest Management (4)
 FST 101. Food Science Orientation (1)
 FST 251. Introduction to Wines, Beers and Spirits (3)
 FST 260. Food Science and Technology in Western Culture (3)
 FST 273. Wine in the Western World (3)
 FST 401. Research (up to 3 credits)
 FST 410. Internship (up to 3 credits)
 FST 420. Sensory Evaluation of Food (4)
 FST 430. Innovation and Food Product Development (4)
 FST 480. Topics in Fermentation (up to 2 credits)
 HORT 251. Temperate Tree Fruit, Berries, Grapes and Nuts (2)
 HORT 316. Plant Nutrition (4)
 HORT 452. Berry and Grape Physiology and Culture (4)
 MB 440. Food Microbiology (3)
 MB 441. Food Microbiology Laboratory (2)
 NUTR 216. *Food in Non-Western Culture (3)
 TOX 429. Toxic Substances in Food (3)

FERMENTATION SCIENCE OPTION

The Fermentation Science Option, one of just a handful of such programs in the nation, is a hands-on applied science addressing the biological, chemical and physical processes of fermented foods, including those used in the production of wine and beer, as well as a variety of other fermented foods such as cheese, yogurt, soy sauce, pickles, breads, and fermented vegetables. Graduates enjoy a wide variety of employment opportunities—including some of the nation's largest wineries and breweries, artisan cheese plants, coffee, soy, and pickle companies, among others. Graduates of the Fermentation Science option can readily cross over from the beverage industry to the food industry with good preparedness.

Foundation Science Courses

PH 202. *General Physics (5)
Choose one of NUTR 225 or NUTR 240:
 NUTR 225. General Human Nutrition (3)
 NUTR 240. Human Nutrition (3)

Food Science and Technology Courses

FST 460. Brewing Science (3)
 FST 466. Wine Production Principles (3)
 FST 479. Fermentation Microbiology (3)
 FST 490. Food Processing Calculations (2)
 FST 491. Food Processing Calculations Laboratory (1)
 FST 495. Food Packaging (2)
Complete two courses from among FST 423, FST 461 and FST 467. If all three are selected, credits from one course are applied to the Option Electives requirements below:
 FST 423. Food Analysis (4)
 FST 461. Brewing Analysis (3)
 FST 467. Wine Production, Analysis, and Sensory Evaluation (5)

Fermentation Science Option Electives

Complete 9–11 credits from the list below, to bring the total in the Fermentation Science Option to 40. At least 3 option electives credits must be upper division:

AG 407. Seminar: Leadership Academy (3)¹
 FST 101. Food Science Orientation (1)
 FST 251. Intro to Wines, Beers, and Spirits (3)
 FST 212. Dairy Processing (2)
 FST 213. Dairy Processing Laboratory (1)
 FST 260. *Food Science and Technology in Western Culture (3)
 FST 273. *Wine in the Western World (3)
 FST 401. Research (3)¹
 FST 410. Internship (3)^{1,2}
 FST 420. Sensory Evaluation of Food (4)
 FST 430. Innovation and Food Product Development (4)
 FST 480. Topics in Fermentation (1) (up to 2 credits of FST 480 may be applied)
 MB 440. Food Microbiology (3)
 MB 441. Food Microbiology Laboratory (2)
 NUTR 216. *Food in Non-Western Culture (3)
 TOX 429. Toxic Substances in Food (3)

Total=40

Footnotes:

- ¹ Competitive selection and/or departmental approval required.
- ² Students may not earn internship credit in all states. Consult with internship coordinator for list of eligible states.

Students may complete more than one option. Courses must be selected so that at least 12 credits in each option are counted uniquely toward requirements of that option.

FST Major 2.00 GPA Requirement (Fermentation Science Option)
The following courses are included in calculation of the FST Major GPA for students in the Fermentation Science option:

BB 350. Elementary Biochemistry (4)
 BEE 472. Introduction to Food Engineering Principles (5)

BEE 473. Introduction to Food Engineering Process Design (3)
 CH 324. Quantitative Analysis (4)
 FST 360. Food Safety and Sanitation (3)
 FST 370. Industry Preparation/HACCP (3)
 FST 407. Senior Seminar (1)
 FST 421. *Food Law (3)
 FST 422. Food Chemistry Fundamentals (4)
 FST 425. *Food Systems Chemistry (4)
 FST 460. Brewing Science (3)
 FST 466. Wine Production Principles (3)
 FST 479. Fermentation Microbiology (3)
 FST 490. Food Processing Calculations (2)
 FST 491. Food Processing Calculations Laboratory (1)
 FST 495. Food Packaging (2)
 MB 302. General Microbiology (3)
 MB 303. General Microbiology Laboratory (2)

Plus any of the following utilized in fulfillment of option requirements:
 AG 407. Seminar: Leadership Academy (up to 3 credits)
 FST 101. Food Science Orientation (1)
 FST 212. Dairy Processing (2)
 FST 213. Dairy Processing Laboratory (1)
 FST 251. Introduction to Wines, Beers, and Spirits (3)
 FST 260. *Food Science and Technology in Western Culture (3)
 FST 273. *Wine in the Western World (3)
 FST 401. Research (up to 3 credits)
 FST 410. Internship (up to 3 credits)
 FST 420. Sensory Evaluation of Food (4)
 FST 423. Food Analysis (4)
 FST 430. Innovation and Food Product Development (4)
 FST 461. Brewing Analysis (3)
 FST 467. Wine Production Analysis, and Sensory Evaluation (5)
 FST 480. Topics in Fermentation (up to 2 cr)
 MB 440. Food Microbiology (3)
 MB 441. Food Microbiology Laboratory (2)
 NUTR 216. *Food in Non-Western Culture (3)
 TOX 429. Toxic Substances in Food (3)

FOOD SCIENCE OPTION

Food scientists belong to the world's largest industry—the food industry. From the farm gate to the market, food scientists develop foods and beverages in response to society's needs and demands, working to make foods safe, nutritious, convenient, economical, and tasty. Food scientists look for better ways to select, preserve, process, and package food products, including the ingredients that go into them. Society's focus on food has increased as a heightened awareness of diet, health, and biosecurity (or food safety) has increased worldwide.

Graduates of the Food Science option are typically interested in research and development of new products, food safety, sensory and flavor qualities, quality control or quality assurance. Some even work as freelance food technologists.

Physics/Statistics Courses

PH 202. *General Physics (5)
 ST 352. Introduction to Statistical Methods (4)

Nutrition Courses**Choose one of the following:**

- NUTR 225. General Human Nutrition (3)
NUTR 240. Human Nutrition (3)

Food Science and Technology Courses

- FST 420. Sensory Evaluation of Food (4)
FST 423. Food Analysis (4)
FST 490. Food Processing Calculations (2)
FST 491. Food Processing Calculations Laboratory (1)
FST 495. Food Packaging (2)
MB 440. Food Microbiology (3)

Complete 3 credits from the 200-level processing courses below (an additional 3 credits from this group may be applied to the option electives):

- ANS 251. Principles of Animal Foods Technology (3)
FST 210. Fruit and Vegetable Processing (3)
FST 212. Dairy Processing (2)
FST 213. Dairy Processing Laboratory (1)

Food Science Option Electives

Complete 10 credits, 3 of which must be upper division, from the list below:

- AG 407. Seminar: *Leadership Academy* (3)¹
FST 101. Food Science Orientation (1)
FST 260. *Food Science and Technology in Western Culture (3)
FST 273. *Wine in the Western World (3)
FST 401. Research (3)¹
FST 410. Internship (3)^{1,2}
FST 430. Innovation and Food Product Development (4)
FST 460. Brewing Science (3)
FST 466. Wine Production Principles (3)
FST 479. Fermentation Microbiology (3)
FST 480. Topics in Fermentation (1)
MB 441. Food Microbiology Laboratory (2)
NUTR 216. *Food in Non-Western Culture (3)
TOX 429. Toxic Substances in Food (3)

Total=41**Footnotes:**

* Baccalaureate Core Course

¹ Competitive selection and/or departmental approval required.² Students may not earn internship credit in all states. Consult with internship coordinator for list of eligible states.

Students may complete more than one option. Courses must be selected so that at least 12 credits in each option are counted uniquely toward requirements of that option.

FST Major 2.00 GPA Requirement (Food Science Option)

The following courses are included in calculation of the FST Major GPA for students in the Food Science option:

- BB 350. Elementary Biochemistry (4)
BEE 472. Introduction to Food Engineering Principles (5)
BEE 473. Introduction to Food Engineering Process Design (3)
CH 324. Quantitative Analysis (4)
FST 360. Food Safety and Sanitation (3)
FST 370. Industry Preparation/HACCP (3)

- FST 407. Senior Seminar (1)
FST 420. Sensory Evaluation of Food (4)
FST 421. *Food Law (3)
FST 422. Food Chemistry Fundamentals (4)
FST 423. Food Analysis (4)
FST 425. ^Food Systems Chemistry (4)
FST 490. Food Processing Calculations (2)
FST 491. Food Processing Calculations Laboratory (1)
FST 495. Food Packaging (2)
MB 302. General Microbiology (3)
MB 303. General Microbiology Laboratory (2)
MB 440. Food Microbiology (3)

Plus any of the following utilized in fulfillment of option requirements:

- AG 407. Seminar: *Leadership Academy* (up to 3 credits)
ANS 251. Principles of Animal Foods Technology (3)
FST 101. Food Science Orientation (1)
FST 210. Fruit and Vegetable Processing (3)
FST 212. Dairy Processing (2)
FST 213. Dairy Processing Laboratory (1)
FST 251. Introduction to Wines, Beers, and Spirits (3)
FST 260. *Food Science and Technology in Western Culture (3)
FST 273. *Wine in the Western World (3)
FST 401. Research (up to 3 credits)
FST 410. Internship (up to 3 credits)
FST 430. Innovation and Food Product Development (4)
FST 460. Brewing Science (3)
FST 466. Wine Production Principles (3)
FST 479. Fermentation Microbiology (3)
FST 480. Topics in Fermentation (1)
MB 441. Food Microbiology Laboratory (2)
NUTR 216. *Food in Non-Western Culture (3)
TOX 429. Toxic Substances in Food (3)

UNDERGRADUATE MINORS**FERMENTATION SCIENCE MINOR****Required Courses (12)**

- FST 251. Introduction to Wines, Beers and Spirits (3)
MB 302. General Microbiology (3)
MB 303. General Microbiology Lab (2)

Select one of the following two:

- BB 350. Elementary Biochemistry (4)
BI 314. Cell and Molecular Biology (4)

Elective Courses (15)

Select 15 credits from the following:

- BIOE 457. Bioreactors I (3)
FST 360. Food Safety and Sanitation (3)
FST 460. Brewing Science (3)
FST 466. Wine Production Principles (3)
FST 467. Wine Production, Analysis, and Sensory Evaluation (5)
FST 479. Fermentation Microbiology (3)
FST 480. Topics in Fermentation (1–2 credits per class)**
MB 440. Food Microbiology (3)
MB 441. Food Microbiology Lab (2)
**May take up to 4 credits.

Total=27**FOOD SCIENCE MINOR****Required Courses (7 credits)**

- FST 360. Food Safety and Sanitation (3)
FST 422. Food Chemistry Fundamentals (4)

Elective Courses

Select 20 credits from the following (at least 5 credits must be upper division):

- ANS 251. Principles of Animal Foods Technology (3)
BEE 472. Introduction to Food Engineering Principles (5)
BEE 473. Introduction to Food Engineering Process Design (3)
FST 210. Fruit and Vegetable Processing (3)
FST 212. Dairy Processing (2)
FST 213. Dairy Processing Laboratory (1)
FST 251. Introduction to Wines, Beers, and Spirits (3)
FST 260. *Food Science and Technology in Western Culture (3)
FST 273. *Wine in the Western World (3)
FST 420. Sensory Evaluation of Food (4)
FST 421. *Food Law (3)
FST 423. Food Analysis (4)
FST 425. ^Food Systems Chemistry (4)
FST 460. Brewing Science (3)
FST 466. Wine Production Principles (3)
FST 479. Fermentation Microbiology (3)
FST 480. Topics in Fermentation (1–2)
FST 490. Food Processing Calculations (2)
FST 491. Food Processing Calculations Laboratory (1)
FST 495. Food Packaging (2)
MB 440. Food Microbiology (3)
MB 441. Food Microbiology Laboratory (2)
TOX 429. Toxic Substances in Food (3)

Total=27**Footnotes:**

* Baccalaureate Core Course

^ Writing Intensive Course

FOOD TECHNOLOGY MINOR**Required Courses (17)**

- FST 210. Fruit and Vegetable Processing (3)
FST 212. Dairy Processing (2)
FST 213. Dairy Processing Lab (1)
FST 360. Food Safety and Sanitation (3)
FST 421. *Food Law (3)
MB 230. *Introductory Microbiology (4)

Elective Courses

Select 10 credits from the following, 6 must be upper division:

- ANS 251. Principles of Animal Foods Technology (3)
FST 251. Introduction to Wines, Beers, and Spirits (3)
FST 260. Food Science and Technology in Western Culture (3)
FST 420. Sensory Evaluation of Food (4)
FST 480. Topics in Fermentation (1–2 credits per class, can take up to 2 credits)
FST 495. Food Packaging (2)
NUTR 225. Human Nutrition (3)
NUTR 235. Science of Foods (4)

Total=27**Footnotes:**

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

FOOD SCIENCE AND TECHNOLOGY (MAG, MS, PhD)

Graduate Areas of Concentration
Brewing, enology, flavor chemistry, food chemistry/biochemistry, food engineering, food microbiology/biotechnology, food and seafood processing, sensory evaluation

The Department of Food Science and Technology offers graduate programs leading toward the Master of Agriculture, Master of Science, and Doctor of Philosophy degrees. A variety of research specializations are available covering the chemical, physical, microbiological, and sensory properties of foods.

Food processing and engineering research deals with basic and applied aspects of contemporary food technologies. Areas of emphasis include the measurement and modeling of thermo-physical properties of foods and the modeling of heat and mass transfer phenomena. Other studies deal with the use of high pressure as a means of food preservation and the use of edible food coatings to enhance the nutritional quality of fresh fruits and vegetables. Wine-related studies emphasize the effects of processing and vineyard practices on quality. Research in brewing focuses on the effects of processing on beer quality and stability. Dairy processing research concerns milk quality, cheese technology and cheese economics. Investigations on seafood processing and by-product utilization are being conducted on campus, and at the Coastal Oregon Marine Experiment Station Seafood Laboratory in Astoria, Oregon. Packaging and sensory evaluation of value-added food products occurs at the Food Innovation Center in Portland, Oregon.

Studies in food microbiology focus on food safety and the application of beneficial microorganisms in food production. Included in this topic area are studies dealing with the effect of processing conditions on microbial viability and the characterization of yeast strains involved in fermented products.

Sensory science projects focus on an understanding of the fundamental nature of sensory phenomena and characterization of the sensory attributes of selected products.

Food chemistry research concerns the occurrence, role, formation, stability and analysis of various food constituents. Studies involving flavor chemistry and sensory evaluation aim to identify the flavor-active compounds of a wide variety of foods and beverages. Other studies focus on understanding the functional properties of cereal grains and development of environmentally-sustainable chemical and biological processes for converting food wastes and related renewable waste streams into useful byproducts.

Students desiring to pursue graduate study must have a BS degree or equivalent. Students from related fields of study (chemistry, microbiology, biology, etc.) should have a strong background in the basic sciences and must have earned at least a B (GPA 3.0) average during their last two years of undergraduate study.

FOOD SCIENCE AND TECHNOLOGY GRADUATE MINOR

For more details, see the departmental advisor.

COURSES**FST 101. FOOD SCIENCE ORIENTATION (1).**

For food science majors. Orientation and academic guidance toward career planning in food science and technology.

FST 199. SPECIAL STUDIES (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

FST 210. FRUIT AND VEGETABLE PROCESSING (3).

Lectures, lab activities and plant tours to help majors and non-majors understand traditional and modern fruit and vegetable processing technologies. **PREREQS:** CH 123 or CH 223 or ((CH 233 or CH 233H) and (CH 263 or CH 263H))

FST 212. DAIRY PROCESSING (2). Methods of processing and preserving milk and milk products and related unit operations. **PREREQS:** CH 123 or CH 223 or CH 233 or CH 233H

FST 213. DAIRY PROCESSING LABORATORY (1). Laboratory and field work to accompany FST 212. Field trip required. **PREREQS:** Concurrent enrollment in FST 212

FST 251. INTRODUCTION TO WINES, BEERS, AND SPIRITS (3). A descriptive introduction to the history, science, sensory, economics, and societal aspects of alcoholic beverages. **PREREQS:** High school biology and chemistry. Open to any major.

FST 260. *FOOD SCIENCE AND TECHNOLOGY IN WESTERN CULTURE (3). Exploring the sciences and technologies of food processing and preservation within the context of their historical, current, and possible future influences on what we eat, the structure of our society, and our day-to-day lives. (Bacc Core Course)

FST 273. *WINE IN THE WESTERN WORLD (3). A study of wine throughout history, from its accidental discovery and refinement through today, with a focus on the profound role wine plays in agriculture, social rituals, human health, economics, and the ambivalent pursuit of pleasure. (Baccalaureate Core Course)

FST 360. FOOD SAFETY AND SANITATION (3). Principles, practices, and regulations governing and ensuring the microbiological safety of our food supply through risk assessment, surveillance, and intervention. **PREREQS:** ((BI 211 or BI 211H or BI 212 or BI 212H or BI 213 or BI 213H) and (CH 121 or CH 221 or CH 221H or CH 231 or CH 231H))

FST 370. INDUSTRY PREPARATION/HACCP (3). Assists students in preparation for internships and employment in the food industry by introducing compliance with food safety regulations, HACCP, and audits. **PREREQS:** One year of chemistry and one year of biology.

FST 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

FST 399H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

FST 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

FST 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

FST 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

FST 407. SENIOR SEMINAR (1).

FST 410. INTERNSHIP (1-16). A work internship to give students practical on-the-job training in the food processing or related industries. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Junior standing. Departmental approval, submission of employer and employee evaluation forms, and written reports.

FST 420. SENSORY EVALUATION OF FOOD (4).

Sensory test methods used in the evaluation of the taste, smell, texture, and color of foods as well as the evaluation of consumer acceptance of foods. This includes methods for measuring sensory qualities, underlying psychological principles, statistical methods for analyzing data, and proper interpretation of these results. Lec/lab. **PREREQS:** ((ST 351 or ST 411) and (ST 352* or ST 412*))

FST 421. *FOOD LAW (3). Concepts, statutes, regulations, and agencies controlling the production, processing, and distribution and promotion of food. (Bacc Core Course)

FST 422. FOOD CHEMISTRY FUNDAMENTALS (4).

An integrated lecture/lab/recitation course applying theories of molecular reactivity to model food systems. Lectures focus on the molecular bases of chemical phenomena that dictate the behavior of foods. Laboratories and recitations provide opportunities for students to observe, manipulate, and explore model food systems. Emphasis on major food components (water, lipids, proteins, and carbohydrates) and their behavior under conditions of particular relevance to food processing. Lec/lab/rec. **PREREQS:** ((CH 332 or CH 336) and BB 350 and (MTH 241 or MTH 252 or MTH 252H))

FST 423. FOOD ANALYSIS (4). An integrated laboratory/lecture course covering methods used for the quantitative analysis of the chemical composition of foods and agricultural products. **PREREQS:** CH 324 and CH 337 and BB 350

FST 425. ^FOOD SYSTEMS CHEMISTRY (4).

The chemistry of food components in real-world food systems. Focused on water, proteins, carbohydrates, lipids, and food polymers, their interactions, and the effects of food processing and storage. Integrates writing as a learning tool and means of professional communication. Lec/lab/rec. (Writing Intensive Course) **PREREQS:** FST 422 and /or equivalent.

FST 430. INNOVATION AND FOOD PRODUCT DEVELOPMENT (4).

Provides technical background and hand-on laboratory experience in food product development and food innovation. Lec/lab. **PREREQS:** CH 331 and CH 332 and FST 360 and FST 421 and FST 422

FST 460. BREWING SCIENCE (3). Chemistry, microbiology and engineering of malting and brewing operations for the production of beer, including the compositional analysis of barley, malt, hops, water, and beer and their effects on beer quality. **PREREQS:** MB 302 and BEE 472

FST 461. BREWING ANALYSIS (3).

Compositional analysis, laboratory techniques and sensory evaluation of barley, malt, hops, water, yeast and beer. Lec/lab. **PREREQS:** (FST 460 and (MB 303 or MB 303H))

FST 466. WINE PRODUCTION PRINCIPLES (3).

Principles of wine production technology from grape berry development through bottling, covering the microbiology and chemistry of fermentation, aging and production practices of red and white table wines, as well as sparkling and dessert wines. **PREREQS:** BB 350 and MB 302

FST 467. WINE PRODUCTION, ANALYSIS, AND SENSORY EVALUATION (5). An integrated lecture/lab course that focuses on the practical fundamentals of red and white wine production. Students will make wine and monitor its progression from the grape to the bottle using standard chemical, microbial, and sensorial techniques. **PREREQS:** (FST 466 and FST 479*)

FST 479. FERMENTATION MICROBIOLOGY (3). An introduction to industrial microbiology with a focus on the physiology of fermentation and use of microorganisms for the production of food ingredients, fermented foods, and beverages. FST students need to take BB 350 and MB students need to take BB 450 for their respective majors. **CROSSLISTED** as MB 479/MB 579. **PREREQS:** ((BB 350 or BB 450) and MB 302)

FST 480. TOPICS IN FERMENTATION (1-2). Selected topics in fermentation science will be presented by department faculty and invited outside experts. Topics and format will change each quarter. Students may take the course for 1 or 2 credits as the topics change. Lec/lab. This course is repeatable for a maximum of 8 credits.

FST 490. FOOD PROCESSING CALCULATIONS (2). Application of engineering principles to produce safe processed foods meeting consumer expectations for safety and quality. Validate process engineering models by comparing predicted values with new experimental data. **PREREQS:** (BEE 472 and FST 360) **COREQS:** FST 491

FST 491. FOOD PROCESSING CALCULATIONS LABORATORY (1). Experiments in a pilot plant supported by a computer laboratory. Prepare samples of novel process technology products. **PREREQS:** Microsoft Excel skills. **COREQS:** FST 490

FST 495. FOOD PACKAGING (2). Fundamentals of food packaging covering the major packaging solutions with a focus on plastic, paper, and paperboard. **PREREQS:** Junior standing in a physical or biological science-based major.

FST 499. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 16 credits.

FST 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

FST 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

FST 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

FST 507. SEMINAR (1). This course is repeatable for a maximum of 2 credits.

FST 509. PRACTICUM IN TEACHING (1-16). This course is repeatable for a maximum of 16 credits.

FST 510. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits.

FST 514. HEALTH BENEFITS OF FUNCT FOODS, NUTRACEUT, DIETARY SUPPLEMEN (3). Functional foods, nutraceuticals and dietary supplements represent a rapidly expanding segment of domestic and international markets. This course will overview the principles and procedures necessary to evaluate and market these products. The chemistry and mechanisms of major nutraceutical ingredient categories and current scientific information supporting their biochemical and physiological efficacy will be addressed. Special dietary products, such as medical, weight control, sport, and herbal supplements, will be addressed. Regulatory aspects of labeling and structure-function claims will be covered. **CROSSLISTED** as NUTR 514. **PREREQS:** BB 350 and CH 332

FST 520. SENSORY EVALUATION OF FOOD (4). Sensory test methods used in the evaluation of the taste, smell, texture, and color of foods as

well as the evaluation of consumer acceptance of foods. This includes methods for measuring sensory qualities, underlying psychological principles, statistical methods for analyzing data, and proper interpretation of these results. Lec/lab. **PREREQS:** ST 511* and/or (ST 351* or ST 411*) **COREQS:** ST 512

FST 521. FOOD LAW (3). Concepts, statutes, regulations, and agencies controlling the production, processing, and distribution and promotion of food.

FST 522. FOOD CHEMISTRY FUNDAMENTALS (4). An integrated lecture/lab/recitation course applying theories of molecular reactivity to model food systems. Lectures focus on the molecular bases of chemical phenomena that dictate the behavior of foods. Laboratories and recitations provide opportunities for students to observe, manipulate, and explore model food systems. Emphasis on major food components (water, lipids, proteins, and carbohydrates) and their behavior under conditions of particular relevance to food processing. Lec/lab/rec. **PREREQS:** (CH 332 or CH 336) and BB 350 and (MTH 241 or MTH 252 or MTH 252H)

FST 523. FOOD ANALYSIS (4). An integrated laboratory/lecture course covering methods used for the quantitative analysis of the chemical composition of foods and agricultural products. **PREREQS:** CH 324 and CH 337 and BB 350

FST 525. FOOD SYSTEMS CHEMISTRY (4). Views molecular reactivities and physical chemistry of food components in real-world food systems. The focus is on macro-components (water, proteins, carbohydrates, lipids, and food polymers in general), foods as multi-component systems, and on the effects of thermal processing and storage on processing, texture, color, and consumption of foods. Lec/lab/rec. **PREREQS:** FST 522 and/or equivalent.

FST 560. BREWING SCIENCE (3). Chemistry, microbiology and engineering of malting and brewing operations for the production of beer, including the compositional analysis of barley, malt, hops, water, and beer and their effects on beer quality. **PREREQS:** MB 302 and BEE 472

FST 561. BREWING ANALYSIS (3). Compositional analysis, laboratory techniques and sensory evaluation of barley, malt, hops, water, yeast and beer. Lec/lab. **PREREQS:** FST 460 and (MB 303 or MB 303H)

FST 566. WINE PRODUCTION PRINCIPLES (3). Principles of wine production technology from grape berry development through bottling, covering the microbiology and chemistry of fermentation, aging and production practices of red and white table wines, as well as sparkling and dessert wines. **PREREQS:** BB 350 and MB 302

FST 567. WINE PRODUCTION, ANALYSIS, AND SENSORY EVALUATION (5). An integrated lecture/lab course that focuses on the practical fundamentals of red and white wine production. Students will make wine and monitor its progression from the grape to the bottle using standard chemical, microbial, and sensorial techniques. **PREREQS:** FST 566 **COREQS:** FST 579

FST 579. FERMENTATION MICROBIOLOGY (3). An introduction to industrial microbiology with a focus on the physiology of fermentation and use of microorganisms for the production of food ingredients, fermented foods, and beverages. FST students need to take BB 350 and MB students need to take BB 450 for their respective majors. **CROSSLISTED** as MB 479/MB 579. **PREREQS:** (BB 350 or BB 450) and MB 302

FST 590. FOOD PROCESSING CALCULATIONS (2). Application of engineering principles to produce safe processed foods meeting consumer expectations for safety and quality. Validate process engineering models by comparing predicted values with new experimental data.

PREREQS: (BEE 572 and MB 540) and Microsoft Excel skills. **COREQS:** FST 591

FST 591. FOOD PROCESSING CALCULATIONS LABORATORY (1). Experiments in a pilot plant supported by a computer laboratory. Prepare samples of novel process technology products. **PREREQS:** Microsoft Excel skills. **COREQS:** FST 590

FST 595. FOOD PACKAGING (2). Fundamentals of food packaging covering the major packaging solutions with a focus on plastic, paper, and paperboard. **PREREQS:** Junior standing in a physical or biological science-based major.

FST 599. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 16 credits.

FST 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

FST 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

FST 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

FST 607. SEMINAR (1). This course is repeatable for a maximum of 2 credits.

FST 620. ADVANCED TOPICS IN SENSORY SCIENCE (2). Current and/or advanced subjects in human sensory science. Includes 1) topics in human flavor perception that covers human psychophysics, neuroscience, and related fields, and 2) sensory evaluation techniques and data handling methods that are advanced in nature. Different points of view regarding above topics will be discussed. This course is repeatable for a maximum of 4 credits. **PREREQS:** FST 520

FST 628. FLAVOR CHEMISTRY (3). The definition of flavor, analytical methods in flavor chemistry, and mechanisms of odor interaction in food system will be discussed. In addition, an integrated approach will be used to study the flavor chemistry of economically-important agricultural products in the Pacific Northwest such as dairy products, fruits, and alcoholic beverages. **PREREQS:** FST 522 and FST 523

FST 639. FOOD POLYMER SCIENCE (3). Investigates the theoretical principles and structure-function relationships of food macromolecules. The theoretical principles are related, where possible, to observable phenomena during thermal processing and storage of foods. **PREREQS:** (FST 422 or FST 522) and (FST 425 or FST 525) or equivalent

FST 641. PROCESSING WHEAT AND OTHER SMALL GRAINS: A MOLECULAR VIEW (3). Provides a fundamental overview of wheat and other cereals from the perspective of the molecular level events that are important in milling, baking, and other processes. Uses cereal processing (focused primarily on bread-making) as the vehicle for placing elements of food chemistry, food polymer science, physical chemistry, and rheology into the cohesive framework of a single food category. Students will experience how the sciences of chemistry, physics, engineering, microbiology, biochemistry, nutrition, etc. amalgamate in the production of the selected cereal products. Lec/lab.

FST 666. ADVANCED TOPICS IN ENOLOGY (3). An in-depth investigation of advanced wine processing techniques and wine research, focusing on their impact on production and wine quality. **PREREQS:** FST 566 and FST 567* and it is recommended that the student have taken a viticulture course (HORT 454) and have a good understanding of how vineyard practices influence grape quality.

HORTICULTURE

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Oregon State University
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FACULTY

Professors Azarenko, Chen, Long, McGrath, Mehlenbacher, J. Miller, Myers, Olsen, Shearer, Strik, Sugar, VanBuskirk
Associate Professors Braunworth, Bubl, Castagnoli, Detweiler, Kaiser, Lambrinos, Langellotto, McMahan, Nonogaki, Peachey, Regan, Renquist, Rosetta, Skinkis, Stone, Walton, Yang
Assistant Professors Albert, Contreras, DeFrancesco, Deluc, Einhorn, Hooven, Kowalewski, W. Miller, Pagay, Sagili, Wang
Instructors Andrews, Bell, Fick, Finger-McDonald, Garrett, Matthewson, B. Miller, Millison, Powell, Reynolds, Shay, White

COURTESY FACULTY

Abusrewil, Giuma Shebani; Bassil, Nahla Victor; Bruck, Denny Joseph; Bryla, David Roman; Cristofori, Valerio; Dass, Meera Chettri; Finn, Chad E.; Golembiewski, Robert; Griesbach, John; Hummer, Kim Ethel; Lee, Jana; Lee, Jung-Min; Martin, Ruth C.; Owen Jr., James S.; Reed, Barbara Mary; Rivero, Maria Victoria; Scagel, Carolyn Francis; Schreiner, R. Paul; Seiter, Stefan; Tarara, Julie M.

ADJUNCT FACULTY

Bondi, Hays, Kennedy, Stephenson

Undergraduate Major

Horticulture (BS, CRED, HBS)

Options

Ecological and Sustainable Horticultural Production
Ecological Landscape and Urban Forestry
General Horticulture (Online)
Horticultural Research
Plant Breeding and Genetics
Therapeutic Horticulture
Turf Management
Viticulture and Enology

Minors

Entomology

(Administered by the Department of Horticulture in the College of Agricultural Sciences.)

Horticulture

Turf and Landscape Management

Graduate Major

Horticulture (MAg, MAIS, MS, PhD)

Graduate Areas of Concentration

Breeding, Genetics and Biotechnology
Community and Landscape Horticultural Systems
Sustainable Crop Production

Graduate Options

Entomology
Plant Breeding and Genetics

Graduate Minor Horticulture

Horticulture involves the production, genetic improvement, storage, and marketing of fruits, nuts, vegetables, flowers, and vegetable crops; and the design, construction, and management of landscape plantings such as parks, gardens, golf courses, restoration projects, and sports fields. It is a science, an art, an avocation, and a business.

Horticultural and other high value specialty crops are the largest component of Oregon's agricultural industry. Landscape horticulture is a rapidly expanding service industry in the urban areas of the Pacific Northwest and throughout the nation. Excellent and varied career opportunities exist for college graduates in both crop and landscape horticulture.

The undergraduate program provides students with a solid background in the fundamental life and physical sciences, as well as an understanding of the technologies and management systems used in the horticultural industry. Problem-solving and decision-making skills are stressed, as is student involvement. Field trips are an important component of many of the courses.

The program has eight options:

1. Ecological and Sustainable Horticultural Production
2. Ecological Landscape and Urban Forestry
3. General Horticulture (Online)
4. Horticultural Research
5. Plant Breeding and Genetics
6. Therapeutic Horticulture
7. Turf Management
8. Viticulture and Enology

The **Ecological and Sustainable Horticultural Production** option prepares students for careers dealing directly or indirectly with the production, breeding, post-harvest handling, marketing, and scientific study of horticultural crops.

The **Ecological Landscape and Urban Forestry** option prepares students to be practitioners and leaders in the design, construction, and installation of our green spaces.

The **General Horticulture** is an online option and is especially recommended for students already working in the horticultural industry, whose careers will benefit from post-secondary education in the horticultural sciences.

The **Horticultural Research** option prepares students to assist in research or pursue graduate studies.

The **Plant Breeding and Genetics** option provides an interdisciplinary approach to applied plant breeding and practical experience in breeding and genetic analysis working in the greenhouse, field, and laboratory.

The **Therapeutic Horticulture** option prepares students to design healing and adapted gardens and to provide therapy programs used to improve the quality of people's lives.

The **Turf Management** option prepares students for careers in golf course maintenance and park and athletic field maintenance.

The **Viticulture and Enology** option prepares students for careers in Oregon's growing vineyard and winery industry.

All options allow the student considerable flexibility to pursue a minor or to tailor course work to meet individual goals. Qualified students interested in the business aspects of horticulture are encouraged to pursue a minor in business. All undergraduates are required to complete either an approved internship or an undergraduate research project.

A high school student preparing for the program should follow a well-balanced college preparatory curriculum. Course work in biology, chemistry, and mathematics is strongly recommended. Course work in the social sciences, humanities, arts, and foreign languages is also encouraged, and the student should develop public speaking and writing abilities.

The program was designed to facilitate timely completion of degree requirements by transfer and postbaccalaureate students. Students intending to transfer into the program from a two- or four-year institution should complete as many of the lower-division requirements as possible. Some professional-technical courses from community colleges may be equivalent to lower-division horticulture courses. Equivalent credit can be given for such courses. Contact a departmental advisor for further information.

For additional information about the program, contact one of the undergraduate advisors: Kelly Donegan (head advisor, all options), and Autumn Granger (advisor for the General Horticulture option).

GRADE REQUIREMENTS

Students pursuing a major or minor in horticulture are required to receive a grade of C- or better in all horticulture courses that are required for completion of their major and option, or minor. If a grade below C- is received in a horticulture course required for their major and option, or minor, a student will need to

re-take the course and receive a grade of C- or better. If the grade below a C- was received for a course that is part of a group of courses where the student can select which courses to take (i.e., they do not need to take all of the courses, just a specified number of courses or credits) then it would be acceptable for the student to substitute a course for the one that they had received a grade below a C-. For example, in most of our options, a student needs to complete three of four plant identification courses. If a student received a grade lower than a C- in one of the classes, they could either re-take the same course or complete the other three courses with a grade of C- or better.

HORTICULTURE (BS, CRED, HBS)

Also offered via *Ecampus*.

BS Degree Baccalaureate Core Requirements (33)

All students must complete an option and its corresponding core to complete the major, which requires a minimum of 180 credits.

ECOLOGICAL AND SUSTAINABLE HORTICULTURAL PRODUCTION OPTION

Students in the Ecological and Sustainable Horticultural Production option gain the knowledge and skills necessary to plan and manage horticultural production systems for fruit, vegetable, nursery, and greenhouse crops using environmentally sustainable practices. They come to see horticulture as a way to create and maintain vital and productive agro-ecosystems and understand the role of horticulture within a larger societal context which includes issues of ecology, economics, and politics.

The Ecological and Sustainable Horticultural Production option stresses active learning, case studies about real-world situations, and integrating ideas and facts from many different subjects. Ecological and Sustainable Horticultural Production graduates will be active learners, and possess skills prized by employers and useful for establishing their own enterprises. They will have a broad and thorough knowledge of horticulture and the skills and knowledge needed to identify, develop, and practice ecological and sustainable methods. They will be able to think critically. They will be skilled in finding and using information, as well as synthesizing information from many sources to analyze novel situations and solve problems in the field.

Major Core

General Science

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

Choose 1 of the following chemistry series:

CH 121. General Chemistry (5) and CH

122, CH 123. *General Chemistry (5,5)

OR:

CH 231, CH 232, CH 233. *General Chemistry (4,4,4)

and CH 261, CH 262, CH 263.

*Laboratory for Chemistry 231, 232, 233 (1,1,1)

MTH 112. *Elementary Functions (4)

or MTH 241. *Calculus for Management and Social Science (4)

or MTH 245. *Calculus for Management, Life, and Social Sciences (4)

Orientation

HORT 101. Integrating Plant, Soil and Insect Science (1)

Agricultural Science

BOT 331. Plant Physiology (4)

BOT 350. Introductory Plant Pathology (4)

CROP 440. Weed Management (4)

ENT 311. Introduction to Insect Pest Management (4)

SOIL 205. *Soil Science (4)

Experiential Learning

HORT 403 or 410. Thesis/Internship (6-12)

HORT 407. Senior Seminar (1)

Ecology

HORT 318. ^Applied Ecology of Managed Ecosystems (3)

Technology

HORT 414. Information Systems in Agriculture (4)

Writing Intensive Course (WIC)

HORT 318. ^Applied Ecology of Managed Ecosystems (3)

Capstone

HORT 480. Case Studies in Cropping Systems Management (4)

Option Requirements

Horticultural Sciences

HORT 112. Introduction to Horticultural Systems, Practices and Careers (2)

HORT 301. The Biology of Horticulture (3)

HORT 311. Plant Propagation (4)

HORT 316. Plant Nutrition (4)

HORT 411. Horticulture Book Club (1)

HORT 412. Career Exploration: Internships and Research Projects (1)

Plant Materials

Select 3 of the following courses:

BOT 425. Flora of the Pacific Northwest (3)

HORT 226. Landscape Plant Materials I: Deciduous Hardwoods and Conifers (4)

HORT 228. Landscape Plant Materials II: Spring Flowering Trees and Shrubs (4)

HORT 251. Temperate Tree Fruit, Berries, Grapes and Nuts (2)

HORT 255. Herbaceous Ornamental Plant Materials (3) *Ecampus only*

HORT 433. Systematics and Adaptations of Vegetable Crops (4)

Advanced Horticultural Science

CROP/HORT 300. Crop Production in Pacific Northwest Agroecosystems (4)

HORT 495. Horticultural Management Plans (3)

PBG 430. Plant Genetics (3)

PBG 431. Plant Genetics Recitation (1)

SOIL 316. Nutrient Cycling in Agroecosystems (4)

Horticultural Production Electives

Select 3 of the following courses:

HORT 260. Organic Farming/Gardening (3)

HORT 351. Floriculture and Greenhouse Systems (4)

HORT 361. Plant Nursery Systems (4)

HORT 451. Tree Fruit Physiology and Culture (4)

HORT 452. Berry and Grape Physiology and Culture (4)

HORT 453. Grapevine Growth and Physiology (3)

HORT 454. Principles and Practices Vineyard Production (3)

Horticultural Electives

Select a minimum of 3 credits from this list, or from the above list:

CROP/SOIL 325. ^Ag and Environmental Predicaments: Case Study Approach (3)

ENT 322. Honey Bee Biology and Beekeeping (3)

HORT 199, 299, 399, 499. Special Topics in Agriculture (1)

HORT 285. Permaculture Design and Theory: Certificate Course (4)

HORT 463. Seed Biology (3)

PBG 441. Plant Tissue Culture (4)

PBG 450. Plant Breeding (4)

SOIL 455. Biology of Soil Ecosystems (4)

Business Management

Select 1 course from the following:

AREC 211. Management in Agriculture (4)

BA 215. Fundamentals of Accounting (4)

BA 260. Introduction to Entrepreneurship (4)

BA 463. Family Business Management (4)

Government and Policy

Select 1 of the following courses:

AREC 250. *Introduction to Environmental Economics and Policy (3)

AREC 253. *Environmental Law, Policy, and Economics (4)

FES 492. Ecosystem Services Ecology, Sociology, Policy (3)

NR 350. *Sustainable Communities (4)

NR 455. Natural Resource Decision Making (4)

PS 201. *Introduction to US Government and Politics (4)

PS 205. *Introduction to International Relations (4)

PS 331. State and Local Government and Politics (4)

PS 475. Environmental Politics and Policy (4)

Ecology and Sustainability Ecosystems Courses

Meets Synthesis Requirements. Each course must be from a different department.

Contemporary Global Issues: Select one of the following courses:

AREC 351. *Natural Resource Economics and Policy (3)

AREC 461. ^Agricultural and Food Policy Issues (4)

BI 301. *Human Impacts on Ecosystems (3)

BI 306. *Environmental Ecology (3)

BI 349. *Biodiversity: Causes, Consequences and Conservation (3)

CROP 330. *World Food Crops (3)

FES 365. *Issues in Natural Resources Conservation (3)

FW 325. *Global Crises in Resource Ecology (3)
 GEO 300. *Sustainability for the Common Good (3)
 GEO 330. *^Geography of International Development and Globalization (3)
Science, Technology and Society, Select 1 of the following courses:
 ANS 315. *Contentious Social Issues in Animal Agriculture (3)
 AREC 352. *Environmental Economics and Policy (3)
 BI/FES 435. *Genes and Chemicals in Agriculture: Value and Risk (3)
 CH 374. *Technology, Energy, and Risk (3)
 CSS/SOIL 395. *World Soil Resources (3)
 ENGR 350. *Sustainable Engineering (3)
 ENSC 479. *^Environmental Case Studies (3)
 FST 421. *Food Law (3)
 FW 485. *Consensus and Natural Resources (3)
 GEO 300. *Sustainability for the Common Good (3)
 GEO 335. *Introduction to Water Science and Policy (3)
 HST 481. *Environmental History of the United States (4)
 HSTS 421. *Technology and Change (4)
 HSTS 470. *Ecology and History: Landscapes of the Columbia Basin (3)
 NUTR 312. *Issues in Nutrition and Health (3)
 PH 313. *Energy Alternatives (3)
 PS 476. *Science and Politics (4)
 RNG 477. *Agroforestry (3)
 Z 348. *Human Ecology (3)

Research Track (optional)

HORT 406. Projects: Data Presentations (1)
 MTH 251. *Differential Calculus (4)
 MTH 252. Integral Calculus (4)
 ST 351. Introduction to Statistical Methods (4)

Select 3 of the following:

BB 350. Elementary Biochemistry (4)
 BI 370. Ecology (3)
 BOT 341. Plant Ecology (4)
 CH 331. Organic Chemistry (4)
 CH 332. Organic Chemistry (4)
 CH 337. Organic Chemistry Laboratory (4)
 MB 230. Introductory Microbiology (4)
 PH 201. *General Physics (5)
 PH 202. *General Physics (5)

Grade Requirements

Students pursuing a major or minor in horticulture are required to receive a grade of C– or better in all HORT (horticulture) and PBG (plant breeding and genetics) courses that are required for completion of their major and option, or minor. If a grade below C– is received in a HORT or PBG course required for their major and option, or minor, a student will need to re-take the course and receive a grade of C– or better. If the grade below a C– was received for a course that is part of a group of courses where the student can select which courses to take (i.e., they do not need to take all of the courses, just a specified number of courses or credits) then it would be acceptable for the student to substitute a course for

the one that they had received a grade below a C–. For example, in most of the options, a student needs to complete three of four plant identification courses. If a student received a grade lower than a C– in one of the classes, they could either re-take the same course or complete the other three courses with a grade of C– or better.

Footnotes:

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

ECOLOGICAL LANDSCAPE AND URBAN FORESTRY OPTION

The landscape industry and urban forestry sector are large and diverse, offering careers in landscape design, construction, management, and restoration; conservation; park, botanical and public garden management; urban forestry policy and management; research; consulting; and interior-scaping. Landscape professionals design, build, and manage aesthetically pleasing, functional, and environmentally responsible natural spaces where we all live, work, and play. In recent years, the industry has expanded and rapidly become more sophisticated to meet the challenges of today's urban environment. Consequently, there is great demand for creative, motivated individuals who love the outdoors and enjoy working with plants, soil, water, nature, and people.

In the Ecological Landscape and Urban Forestry option, students will learn about sustainable landscape management, urban forestry, and about the ecosystem services provided by the built environment, such as carbon sequestration and climate regulation, temperature modulation, waste decomposition and detoxification, purification of water and air, storm and rain water management, crop pollination, pest and disease control, nutrient dispersal and cycling, seed dispersal, and intellectual and spiritual inspiration, recreational experiences and scientific discovery.

Major Core

General Science

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

Choose 1 of the following chemistry series:

CH 121. General Chemistry (5) and CH 122, CH 123. *General Chemistry (5,5)

OR:

CH 231, CH 232, CH 233. *General Chemistry (4,4,4) and CH 261, CH 262, CH 263. *Laboratory for Chemistry 231, 232, 233 (1,1,1)

MTH 112. *Elementary Functions (4) or MTH 241. *Calculus for Management and Social Science (4) or MTH 245. *Calculus for Management, Life, and Social Sciences (4)

Orientation

HORT/SOIL 101. Introduction to Horticulture, Crop, Soil, and Insect

Science (1)

Agricultural Science

BOT 331. Plant Physiology (4)
 BOT 350. Introductory Plant Pathology (4)
 CROP 440. Weed Management (4)
 ENT 311. Introduction to Insect Pest Management (4)
 SOIL 205. *Soil Science (4)

Experiential Learning

HORT 403. Thesis (6–12 credits) or HORT 410. Internship (6–12 credits)
 HORT 407. Seminar (1)

Ecology

HORT 318. ^Applied Ecology of Managed Ecosystems (3)

Technology

HORT 380. Sustainable Landscape Design (3)

Writing Intensive Course (WIC)

HORT 318. ^Applied Ecology of Managed Ecosystems (3)

Capstone

Select 1 of the following courses:

HORT 480. Case Studies in Cropping Systems Management (4)
 HORT 495. Horticultural Management Plans (3)

Option Requirements

Horticultural Science

HORT 112. Introduction to Horticultural Systems, Practices and Careers (2)
 HORT 301. The Biology of Horticulture (3)
 HORT 311. Plant Propagation (4)
 HORT 316. Plant Nutrition (4)
 HORT 411. Horticulture Book Club (1)
 HORT 412. Career Exploration (1)

Plant Materials

HORT 226. Landscape Plant Materials I: Deciduous Hardwoods and Conifers (4)
 HORT 228. Landscape Plant Materials II: Spring Flowering Trees and Shrubs (4)

Select 1 of the following courses:

BOT 425. Flora of the Pacific Northwest (3)
 FES 141. Tree and Shrub Identification (3)
 HORT 251. Temperate Tree Fruits, Berries, Grapes, and Nuts (2)
 HORT 255. Herbaceous Ornamental Plant Materials (3)**Ecampus only**
 HORT 433. Systematics and Adaptations of Vegetable Crops (4)
 RNG 353. Wildland Plant Identification (4)

Science and Technology of Managed Ecosystems

FES/HORT 350. Urban Forestry (3)
 FES/HORT 447. Arboriculture (4)**Ecampus only**

HORT 315. Sustainable Landscapes: Maintenance, Conservation, Restore (4)
 HORT 358. Landscape Construction Techniques (4)
 HORT 360. Landscape Construction: Irrigation and Drainage (4)
 HORT 361. Plant Nursery Systems (4)

Select 1 of the following courses:

HORT 285. Permaculture Design and Theory: Certificate Course (4)
 HORT 314. Principles of Turfgrass Maintenance (4)
 HORT/FES 455. Urban Forest Planning, Policy and Management (4)**Ecampus only**

Select 1 of the following courses:

- BI 301. *Human Impacts on Ecosystems (3)
 CROP/SOIL 325. ^Ag and Environmental
 Predicaments: A Case Study Approach (3)
 ENT/HORT 300. *Plagues, Pests, and
 Politics (3)
 FES/FW 445. Ecological Restoration (4)
 FW 462. Ecosystem Services (3)
 GEO 335. *Introduction to Water Science
 and Policy (3)
 GEO 423. Land Use in the American West (3)
 HORT 414. Information Systems in
 Agriculture (4)
 RNG 355. Desert Watershed Management
 (3)
 SOIL 316. Nutrient Cycling in
 Agroecosystems (4)
 SOIL 455. Biology of Soil Ecosystems (4)

Business Management**Select 1 of the following courses:**

- AREC 211. Management in Agriculture (4)
 BA 215. Fundamentals of Accounting (4)
 BA 260. Introduction to Entrepreneurship (4)
 BA 463. Family Business Management (4)

Ecology and Sustainability**Ecosystems Courses**

Meets Synthesis requirements. Each course must be from a different department.

Contemporary Global Issues**Select 1 of the following courses:**

- AREC 351. *Natural Resource Economics
 and Policy (3)
 AREC 461. ^Agricultural and Food Policy
 Issues (4)
 BI 301. *Human Impacts on Ecosystems (3)
 BI 306. *^Environmental Ecology (3)
 BI 349. *Biodiversity: Causes, Consequences
 and Conservation (3)
 CROP 330. *World Food Crops (3)
 FES 365. *Issues in Natural Resources
 Conservation (3)
 FW 325. *Global Crises in Resource Ecology
 (3)
 GEO 300. *Sustainability for the Common
 Good (3)
 GEO 330. *^Geography of International
 Development and Globalization (3)

Science, Technology and Society**Select 1 of the following courses:**

- ANS 315. *Contentious Social Issues in
 Animal Agriculture (3)
 AREC 352. *Environmental Economics and
 Policy (3)
 BI/FES 435. *Genes and Chemicals in
 Agriculture: Value and Risk (3)
 CH 374. *Technology, Energy, and Risk (3)
 CSS/SOIL 395. *World Soil Resources (3)
 ENGR 350. *Sustainable Engineering (3)
 ENSC 479. *^Environmental Case Studies (3)
 FST 421. *Food Law (3)
 FW 485. *Consensus and Natural Resources
 (3)
 GEO 300. *Sustainability for the Common
 Good (3)
 GEO 335. *Introduction to Water Science
 and Policy (3)
 HST 481. *Environmental History of the
 United States (4)
 HSTS 421. *Technology and Change (4)
 HSTS 470. *Ecology and History: Landscapes
 of the Columbia Basin (3)

- NUTR 312. *Issues in Nutrition and Health
 (3)
 PH 313. *Energy Alternatives (3)
 PS 476. *Science and Politics (4)
 RNG 477. *Agroforestry (3)
 Z 348. *Human Ecology (3)

Research Track (optional)

- HORT 406. Projects: Data Presentations (1)
 MTH 251. *Differential Calculus (4)
 MTH 252. Integral Calculus (4)
 ST 351. Introduction to Statistical Methods
 (4)

Select 3 of the following:

- BB 350. Elementary Biochemistry (4)
 BI 370. Ecology (3)
 BOT 341. Plant Ecology (4)
 CH 331. Organic Chemistry (4)
 CH 332. Organic Chemistry (4)
 CH 337. Organic Chemistry Laboratory (4)
 MB 230. Introductory Microbiology (4)
 PH 201. *General Physics (5)
 PH 202. *General Physics (5)

Grade Requirements

Students pursuing a major or minor in horticulture are required to receive a grade of C- or better in all HORT (horticulture) and PBG (plant breeding and genetics) courses that are required for completion of their major and option, or minor. If a grade below C- is received in a HORT or PBG course required for their major and option, or minor, a student will need to re-take the course and receive a grade of C- or better. If the grade below a C- was received for a course that is part of a group of courses where the student can select which courses to take (i.e., they do not need to take all of the courses, just a specified number of courses or credits) then it would be acceptable for the student to substitute a course for the one that they had received a grade below a C-. For example, in most of our options, a student needs to complete three of four plant identification courses. If a student received a grade lower than a C- in one of the classes, they could either re-take the same course or complete the other three courses with a grade of C- or better.

Footnotes:

- * Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

GENERAL HORTICULTURE OPTION

The General Horticulture option is available on the Corvallis campus and via Ecampus.

The online General Horticulture option curriculum is built on a strong foundation in horticultural science. This option is especially recommended for students already working in the horticultural industry, whose careers will benefit from post-secondary education in the horticultural sciences. Students learn horticultural principles and practices associated with horticultural produc-

tion within the context of plant biology, pest management, soils, ecology, and economics with applications in plant nutrition, pest management, business, and marketing. In addition, students are well-informed about the latest technology and trends in the field. The option provides sufficiently broad electives for the student to build his or her curriculum to meet specific goals.

Our graduates are skilled in finding and using information, as well as synthesizing information from many sources to solve problems. On-campus students benefit from field and lab experiences, and internships. Ecampus students will benefit from these same hands-on opportunities. With departmental support, the online student will identify opportunities for field and internship experiences, which will be vetted by the department. Some lab experiences will be in the form of kits that the student will purchase and receive by mail; others will be virtual lab experiences created collaboratively between Horticulture Department faculty and the curriculum design team in Ecampus.

The internship provides professional-level interaction with growers, managers, field reps, and consultants, and provides hands-on experience. Mentoring and advising will assist online students in taking advantage of departmental strengths. We anticipate that many online students will already be employed in one of the horticultural industries.

Major Core**General Science**

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)¹

Choose 1 of the following chemistry series:

CH 121. General Chemistry (5) **and**
 CH 122, CH 123. *General Chemistry (5,5)

OR:

CH 231, CH 232, CH 233. *General
 Chemistry (4,4,4) **and** CH 261, CH 262,
 CH 263. *Laboratory for Chemistry 231,
 232, 233 (1,1,1)

MTH 112. *Elementary Functions (4)
 or MTH 241. *Calculus for Management
 and Social Science (4)
 or MTH 245. *Calculus for Management,
 Life, and Social Sciences (4)

Orientation

HORT/SOIL 101. Introduction to
 Horticulture, Crop, Soil, and Insect
 Science (1)

Agricultural Science

BOT 331. Plant Physiology (4)
 BOT 350. Introductory Plant Pathology (4)
 CROP 440. Weed Management (4)
 ENT 311. Introduction to Insect Pest
 Management (4)
 SOIL 205. *Soil Science (4)

Experiential Learning

HORT 403 or 410. Thesis/Internship (6-12)

Ecology

HORT 318. ^Applied Ecology of Managed Ecosystems (3)

Technology**Select 1 course from the following:**

AG 391. Farm Implements (3)
 FW 303. Survey of Geographic Information Systems in Natural Resources (3)
 GEO 301. Map and Image Interpretation (4)
 GEO 365. Introduction to Geographic Information Systems (4)

Writing Intensive Course (WIC)

HORT 318. ^Applied Ecology of Managed Ecosystems (3)

Capstone

HORT 300. Crop Production in Pacific Northwest Agroecosystems (4)
 or HORT 495. Horticultural Management Plans (3)

Option Requirements**Horticultural Science**

HORT 111. Introduction to Horticultural Crop Production (2)
 HORT 112. Introduction to Horticultural Systems, Practices and Careers (2)
 HORT 301. The Biology of Horticulture (3)
 HORT 311. Plant Propagation (4)
 HORT 316. Plant Nutrition (4)
 HORT 412. Career Exploration: Internships and Research Projects (1)

Plant Materials**Select 3 of the following courses:**

BOT 440. Field Methods in Plant Ecology (4)
 HORT 226. Landscape Plant Materials I: Deciduous Hardwoods and Conifers (4)
 HORT 228. Landscape Plant Materials II: Spring Flowering Trees and Shrubs (4)
 HORT 255. Herbaceous Ornamental Plant Materials (3)**Ecampus only**
 HORT 433. Systematics and Adaptation of Vegetable Crops (4)
 RNG 353. Wildland Plant Identification (4)

Horticultural Production and Management**Select 3 or more of the following courses (9 credits min.):**

CROP 310. Forage Production (4)
 ENT/HORT 300. *Plagues, Pests, and Politics (3)
 ENT 322. Honeybee Biology and Beekeeping (3)
 ENT 440. Issues in Insect Toxicology (3)
Ecampus only.
 FES/HORT 350. Urban Forestry (3)
Ecampus only
 FES/HORT 447. Arboriculture (4)**Ecampus only**
 HORT 260. Organic Farming and Gardening (3)
 HORT 285. Permaculture Design and Theory: Certificate Course (4)
 HORT 286. Permaculture Certification (1)
 HORT 300. Crop Production in Pacific Northwest Agroecosystems (4)
 HORT 314. Principles of Turfgrass Maintenance (4)
 HORT 319. Restoration Horticulture (3)
Ecampus only.
 HORT 349. Diagnosing Plant Problems (3)
Ecampus only.

HORT 451. Tree Fruit Physiology and Culture (4)

HORT 453. Grapevine Growth and Physiology (3)

HORT 454. Principles and Practices Vineyard Production (3)

HORT 495. Horticultural Management Plans (3)

Business Management**Select 1 of the following courses:**

AREC 211. Management in Agriculture (4)
 BA 215. Fundamentals of Accounting (4)
 BA 260. Introduction to Entrepreneurship (4)
 BA 463. Family Business Management (4)

Government and Policy**Select 1 of the following courses:**

AREC 253. Environmental Law, Policy, and Economics (4)
 PS 492. Ecosystem Services Ecology, Sociology and Policy (3)
 HORT/FES 455. Urban Forest Planning, Policy and Management (4)**Ecampus only.**
 PS 201. *Introduction to US Government and Politics (4)
 PS 205. *Introduction to International Relations (4)
 PS 331. State and Local Government and Politics (4)
 PS 475. Environmental Politics and Policy (4)
 PS 476. *Science and Politics (4)

Ecology and Sustainability**Ecosystems Courses**

Meets Synthesis Requirements. Each course must be from a different department.

Science, Technology and Society (Select 1 of the following courses):

ANS 485. *Consensus and Natural Resources (3)
 ANTH 481. *Natural Resources and Community Values (3)
 AREC 352. *Environmental Economics and Policy (3)
 CSS/SOIL 395. *World Soil Resources (3)
 ENSC 479. ^*Environmental Case Studies (3)
 FW 350. *Endangered Species, Society and Sustainability (3)
 GEO 306. *Minerals, Energy, Water and the Environment (3)
 GEO 335. *Introduction to Water Science and Policy (3)
 HST 481. *Environmental History of the U.S. (4)
 HSTS 421. *Technology and Change (4)
 HSTS 470. *Ecology and History: Landscapes of the Columbia Basin (3)
 WGSS 440. *Women and Natural Resources (3)

Contemporary Global Issues**(Select 1 of the following courses):**

AREC 351. *Natural Resource Economics and Policy (3)
 AREC 461. ^Agricultural and Food Policy Issues (4)
 CROP 330. *World Food Crops (3)
 FES 365. *Issues in Natural Resource Conservation (3)
 FW 325. *Global Crises in Resource Ecology (3)
 GEO 300. *Sustainability for the Common Good (3)

PHL 443. *World Views and Environmental Values (3)

SOC 480. *Environmental Sociology (4)

Research Track (optional)

MTH 251. *Differential Calculus (4)
 MTH 252. Integral Calculus (4)
 ST 351. Introduction to Statistical Methods (4)

Select 3 of the following:

BB 350. Elementary Biochemistry (4)
 BI 370. Ecology (3)
 CH 331. Organic Chemistry (4)
 CH 332. Organic Chemistry (4)
 MB 230. Introductory Microbiology (4)

Grade Requirements

Students pursuing a major or minor in horticulture are required to receive a grade of C– or better in all HORT (horticulture) and PBG (plant breeding and genetics) courses that are required for completion of their major and option, or minor. If a grade below C– is received in a HORT or PBG course required for their major and option, or minor, a student will need to re-take the course and receive a grade of C– or better. If the grade below a C– was received for a course that is part of a group of courses where the student can select which courses to take (i.e., they do not need to take all of the courses, just a specified number of courses or credits) then it would be acceptable for the student to substitute a course for the one that they had received a grade below a C–. For example, in most of our options, a student needs to complete three of four plant identification courses. If a student received a grade lower than a C– in one of the classes, they could either re-take the same course or complete the other three courses with a grade of C– or better.

Footnotes:

¹ A full-year biology sequence for science majors must be taken in a classroom setting and must include labs.

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

HORTICULTURAL RESEARCH OPTION

The Horticultural Research option is designed for students interested in graduate school and a career in academic or industrial research. It provides an excellent foundation in the natural sciences and horticulture, and accommodates the specific interests of each student. Graduates of this program will be critical thinkers, and experienced technical communicators. They will be skilled in finding and using information, as well as synthesizing information from many sources to analyze novel situations and solve problems.

The relationship between the student and the research mentor is a key feature of this program. The mentor will assist the student in choosing upper-division

classes that match the student's interests. Each student also completes a research project under the guidance of his or her mentor, and writes an undergraduate thesis. Students can work with horticulture researchers on the OSU campus or at research institutions of their choosing. Our undergraduates have been welcomed at local research institutions including the United States Department of Agriculture-Agricultural Research Service laboratories, the National Clonal Germplasm Repository in Corvallis, the Corvallis Plant Materials Center of the National Resources Conservation Service, and the North Willamette Research and Extension Center.

Major Core

General Science

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)
 CH 231, CH 232, CH 233. *General Chemistry (4,4,4) **and** CH 261, CH 262, CH 263. *Laboratory for Chemistry 231, 232, 233 (1,1,1)
 MTH 251. *Differential Calculus (4)

Orientation

HORT 101. Integrating Plant, Soil and Insect Science (1)

Agricultural Science

BOT 331. Plant Physiology (4)
 BOT 350. Introductory Plant Pathology (4)
 CROP 440. Weed Management (4)
 ENT 311. Introduction to Insect Pest Management (4)
 SOIL 205. Soil Science (4)

Experiential Learning

HORT 403. Thesis (6-12)
 HORT 407. Seminar (1)

Ecology

Select one of the following courses:

BI 370. Ecology (3)
 BOT 341. Plant Ecology (4)
 HORT 318. ^Applied Ecology of Managed Ecosystems (3)

Technology

Select one of the following courses:

HORT 414. Information Systems Management (4)
 PBG 441. Plant Tissue Culture (4)

Writing Intensive Course

Select one of the following courses:

BOT 323. ^Flowering Plants of the World (3)
 CROP/SOIL 325. ^Ag and Environmental Predicaments: A Case Study Approach (3)
 HORT 318. ^Applied Ecology of Managed Ecosystems (3)

Capstone Course

Select one of the following courses:

HORT 452. Berry and Grape Physiology and Culture (4)
 HORT 453. Grapevine Growth and Physiology (3)
 HORT 454. Principles and Practices of Vineyard Production (3)
 HORT 463. Seed Biology (3)
 HORT 480. Case Studies in Cropping Systems Management (4)
 HORT 495. Horticultural Management Plans (3)

PBG 450. Plant Breeding (4)

Option Requirements

Horticultural Science

HORT 112. Introduction to Horticultural Systems, Practices and Careers (2)
 HORT 301. The Biology of Horticulture (3)
 HORT 311. Plant Propagation (4)
 HORT 316. Plant Nutrition (4)
 HORT 411. Horticulture Book Club (1)
 HORT 412. Career Exploration: Internships and Research Projects (1)

Advanced Horticultural Science

PBG 430. Plant Genetics (3)

Plant Materials

Select one of the following courses:

BOT 313. Plant Structure (4)
 BOT 321. Plant Systematics (4)
 BOT 425. Flora of the Pacific Northwest (3)
 CROP 200. Crop Ecology and Morphology (3)
 FES 141. Tree and Shrub Identification (3)
 HORT 226. Landscape Plant Materials I: Deciduous Hardwoods and Conifers (4)
 HORT 228. Landscape Plant Materials II: Spring Flowering Trees and Shrubs (4)
 HORT 251. Temperate Tree Fruit, Berries, Grapes, and Nuts (2)
 HORT 255. Herbaceous Ornamental Plant Materials (3)**ecampus only**
 HORT 433. Systematics and Adaptation of Vegetable Crops (4)

Math and Science Foundation Courses

BB 350. Elementary Biochemistry (4)
 CH 331, CH 332. Organic Chemistry (4, 4)
 MTH 252. Integral Calculus (4)
 PH 201, PH 202. *General Physics (5,5)
 ST 351. Introduction to Statistical Methods (4)

Select 12 credits of upper-division horticulture and life science courses (with approval of research mentor)

Research

HORT 403. Thesis (6-12)
 HORT 406. Projects: Data Presentations (1)

Ecology and Sustainability Ecosystems Courses

Meets Synthesis Requirements. Each course must be from a different department.

Contemporary Global Issues (Select one of the following courses):

AREC 351. *Natural Resource Economics and Policy (3)
 AREC 461. ^Agricultural and Food Policy Issues (4)
 BI 301. *Human Impacts on Ecosystems (3)
 BI 306. *Environmental Ecology (3)
 BI 349. *Biodiversity: Causes, Consequences and Conservation (3)
 CROP 330. *World Food Crops (3)
 FES 365. *Issues in Natural Resources Conservation (3)
 FW 325. *Global Crises in Resource Ecology (3)
 GEO 300. *Sustainability for the Common Good (3)
 GEO 330. **^Geography of International Development and Globalization (3)

Science, Technology and Society (Select one of the following courses):

ANS 315. *Contentious Social Issues in Animal Agriculture (3)
 AREC 352. *Environmental Economics and Policy (3)
 BI/FES 435. *Genes and Chemicals in Agriculture: Value and Risk (3)
 CH 374. *Technology, Energy, and Risk (3)
 CSS/SOIL 395. *World Soil Resources (3)
 ENGR 350. *Sustainable Engineering (3)
 ENSC 479. *^Environmental Case Studies (3)
 FST 421. *Food Law (3)
 FW 485. *Consensus and Natural Resources (3)
 GEO 300. *Sustainability for the Common Good (3)
 GEO 335. *Introduction to Water Science and Policy (3)
 HST 481. *Environmental History of the United States (4)
 HSTS 421. *Technology and Change (4)
 HSTS 470. *Ecology and History: Landscapes of the Columbia Basin (3)
 NUTR 312. *Issues in Nutrition and Health (3)
 PH 313. *Energy Alternatives (3)
 PS 476. *Science and Politics (4)
 RNG 477. *Agroforestry (3)
 Z 348. *Human Ecology (3)

Total=180

Grade Requirements

Students pursuing a major or minor in horticulture are required to receive a grade of C- or better in all HORT (horticulture) and PBG (plant breeding and genetics) courses that are required for completion of their major and option, or minor. If a grade below C- is received in a HORT or PBG course required for their major and option, or minor, a student will need to re-take the course and receive a grade of C- or better. If the grade below a C- was received for a course that is part of a group of courses where the student can select which courses to take (i.e., they do not need to take all of the courses, just a specified number of courses or credits) then it would be acceptable for the student to substitute a course for the one that they had received a grade below a C-. For example, in most of our options, a student needs to complete three of four plant identification courses. If a student received a grade lower than a C- in one of the classes, they could either re-take the same course or complete the other three courses with a grade of C- or better.

PLANT BREEDING AND GENETICS OPTION

The Plant Breeding and Genetics (PB&G) option at Oregon State University embodies the Land Grant mission of integrated research, teaching and extension in the context of cultivar development and fundamental genetics. Plant breed-

ing is a collaborative discipline spanning everything from classical field approaches to gene manipulation at the molecular level. Breeders regularly cooperate with pathologists, entomologists, soil scientists, physiologists, food scientists, genomicists, molecular biologists and experts in other fields.

Students in the Plant Breeding and Genetics option will learn an interdisciplinary approach to applied plant breeding by taking courses across a broad spectrum of disciplines. The option may be tailored to meet students' career goals including graduate school, as well as directly entering public or private sector breeding programs. After completing their degree, students will have gained fundamental knowledge in plant breeding that may be applied in a range of crops including annual and perennial horticultural crops, agronomic food and feed crops, and forestry products.

Major Core

General Science

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

Choose 1 of the following chemistry series:

CH 121. General Chemistry (5) **and** CH 122, CH 123. *General Chemistry (5,5)

OR:

CH 231, CH 232, CH 233. *General Chemistry (4,4,4) **and** CH 261, CH 262, CH 263. *Laboratory for Chemistry 231, 232, 233 (1,1,1)

MTH 112. *Elementary Functions (4) or MTH 241. *Calculus for Management and Social Science (4) or MTH 245. *Calculus for Management, Life, and Social Sciences (4)

Orientation

CROP/HORT 101. Introduction to Horticulture, Crop, Soil, and Insect Science (1)

Plant, Soil and Insect Science

BOT 331. Plant Physiology (4)
BOT 350. Introductory Plant Pathology (4)
CROP 440. Weed Management (4)
ENT 311. Introduction to Insect Pest Management (4)
SOIL 205. *Soil Science (4)

Experiential Learning

PBG 403. Thesis (3–12)
or PBG 410. Internship (3–12)
CROP/HORT 407. Seminar (1)

Ecology

Select 1 of the following courses:

BI 370. Ecology (3)
BOT 341. Plant Ecology (4)
HORT 318. ^Applied Ecology of Managed Ecosystems (3)

Technology

PBG 441. Plant Tissue Culture (4)

Writing Intensive

Select 1 of the following courses:

BOT 323. ^Flowering Plants of the World (3)
CROP/SOIL 325. ^Ag and Environmental Predicaments: A Case Study Approach (3)

HORT 318. ^Applied Ecology of Managed Ecosystems (3)

Capstone

PBG 450. Plant Breeding (4)

Option Requirements

Horticultural Science

HORT 301. The Biology of Horticulture (3)
HORT 311. Plant Propagation (4)
HORT 316. Plant Nutrition (4)
HORT 411. Horticulture Book Club (1)
HORT 412. Career Exploration: Internships and Research Projects (1)

Plant Materials

Select 2 of the following courses:

BOT 313. Plant Structure (4)
BOT 321. Plant Systematics (4)
BOT 425. Flora of the Pacific Northwest (3)
CROP 200. Crop Ecology and Morphology (3)
FES 141. Tree and Shrub Identification (3)
HORT 226. Landscape Plant Materials I: Deciduous Hardwoods and Conifers (4)
HORT 228. Landscape Plant Materials II: Spring Flowering Trees and Shrubs (4)
HORT 251. Temperate Tree Fruits, Berries, Grapes, and Nuts (2)
HORT 255. Herbaceous Ornamental Plant Materials (3) **Ecampus only**
HORT 433. Systematics and Adaptations of Vegetable Crops (4)

Science and Technology

HORT 463. Seed Biology (3)
PBG 430. Plant Genetics (3)
ST 351. Introduction to Statistical Methods (4)

Production and Technology

Select 4 of the following courses for 12 credits minimum:

BOT 332. Laboratory Techniques in Plant Biology (3)
CROP 199. Special Studies: Issues in Sustainable Agriculture (1)
CROP/HORT 300. Crop Production in Pacific Northwest Agroecosystems (4)
CROP 310. Forage Production (4)
CROP 330. *World Food Crops (3)
CROP 460. Seed Production (3)
CROP 590. Experimental Design in Agriculture (4)
CSS 320. Principles of Oil and Fiber Crop Production (1) **Offered at EOU only.**
CSS 321. Principles of Cereal Crop Production (1) **Offered at EOU only.**
CSS 322. Principles of Potato Production (1) **Offered at EOU only.**
HORT 260. Organic Farming and Gardening (3)
HORT 351. Floriculture and Greenhouse Systems (4)
HORT 361. Plant Nursery Systems (4)
HORT 452. Berry and Grape Physiology and Culture (4)
HORT 453. Grapevine Growth and Physiology (3)
HORT 454. Principles and Practices of Vineyard Production (3)
MB 302. General Microbiology (3)
MB 303. General Microbiology Lab (2)
PBG 513. Plant Genetic Engineering (3)
SOIL 316. Nutrient Cycling in Agroecosystems (4)

Plant Synthesis

CROP/HORT 480. Case Studies in Cropping Systems Management (4)

Ecology and Sustainability

Ecosystems Courses

Meets Synthesis Requirements. Each course must be from a different department.

Contemporary Global Issues (Select one of the following courses):

AREC 351. *Natural Resource Economics and Policy (3)
AREC 461. ^Agricultural and Food Policy Issues (4)
BI 301. *Human Impacts on Ecosystems (3)
BI 306. *^Environmental Ecology (3)
BI 349. *Biodiversity: Causes, Consequences and Conservation (3)
CROP 330. *World Food Crops (3)
FES 365. *Issues in Natural Resources Conservation (3)
FW 325. *Global Crises in Resource Ecology (3)
GEO 300. *Sustainability for the Common Good (3)
GEO 330. *^Geography of International Development and Globalization (3)

Science, Technology and Society (Select 1 of the following courses):

ANS 315. *Contentious Social Issues in Animal Agriculture (3)
AREC 352. *Environmental Economics and Policy (3)
BI/FES 435. *Genes and Chemicals in Agriculture: Value and Risk (3)
CH 374. *Technology, Energy, and Risk (3)
CSS 395. *World Soil Resources (3) **Offered at EOU only.**
or SOIL 395. *World Soil Resources (3) **Ecampus only**
ENGR 350. *Sustainable Engineering (3)
ENSC 479. *^Environmental Case Studies (3)
FST 421. *Food Law (3)
FW 485. *Consensus and Natural Resources (3)
GEO 300. *Sustainability for the Common Good (3)
GEO 335. *Introduction to Water Science and Policy (3)
HST 481. *Environmental History of the United States (4)
HSTS 421. *Technology and Change (4)
HSTS 470. *Ecology and History: Landscapes of the Columbia Basin (3)
NUTR 312. *Issues in Nutrition and Health (3)
PH 313. *Energy Alternatives (3)
PS 476. *Science and Politics (4)
RNG 477. *Agroforestry (3)
Z 348. *Human Ecology (3)

Upper-Division Units=60

Total Units=180

Research Track (optional)

HORT 406. Projects: Data Presentations (1)
MTH 251. *Differential Calculus (4)
MTH 252. Integral Calculus (4)
ST 351. Introduction to Statistical Methods (4)

Select 3 of the following:

BB 350. Elementary Biochemistry (4)
BI 370. Ecology (3)

BOT 341. Plant Ecology (4)
 CH 331 Organic Chemistry (4)
 CH 332. Organic Chemistry (4)
 CH 337. Organic Chemistry Lab (4)
 MB 230. *Introductory Microbiology (4)
 PH 201. *General Physics (5)
 PH 202. *General Physics (5)

Grade Requirements

Students pursuing the Plant Breeding and Genetics option under the Horticulture major and Crop and Soil Science major are required to receive a grade of C- or better in all BOT, CROP, CSS, FOR, HORT, MB, PBG, SOIL and ST courses required within their major and option.

Footnotes:

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

THERAPEUTIC HORTICULTURE OPTION

Horticultural therapy is a rapidly growing area of horticulture. The therapeutic benefits of garden environments have been understood and applied since ancient times. Horticultural therapy is recognized as a practical and effective treatment with wide-ranging benefits for people in therapeutic, vocational, and wellness programs. It is now taught and practiced throughout the world in a wide diversity of settings and cultures including mental health, physical rehabilitation, vocational services, corrections, long-term care and hospice, special education, and youth and community services. Horticultural therapists design garden spaces that accommodate people with a wide range of abilities and assist people with physical, emotional or mental disabilities in gaining skills, adaptations, and coping methods that enhance their lives.

Students in the Therapeutic Horticulture option graduate with a strong foundation in horticultural science and practices. In addition, they acquire the skills and knowledge needed to design healing and adapted gardens and to provide therapy programs used to improve the quality of people's lives.

Major Core

General Science

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

Choose 1 of the following chemistry series:

CH 121. General Chemistry (5) **and**
 CH 122, CH 123. *General Chemistry (5,5)

OR:

CH 231, CH 232, CH 233. *General Chemistry (4,4,4)

and CH 261, CH 262, CH 263.

*Laboratory for Chemistry 231, 232, 233 (1,1,1)

MTH 112. *Elementary Functions (4)
 or MTH 241. *Calculus for Management and Social Science (4)
 or MTH 245. *Calculus for Management, Life, and Social Sciences (4)

Orientation

HORT/SOIL 101. Introduction to Horticulture, Crop, Soil, and Insect Science (1)

Agricultural Science

BOT 331. Plant Physiology (4)
 BOT 350. Introductory Plant Pathology (4)
 CROP 440. Weed Management (4)
 ENT 311. Introduction to Insect Pest Management (4)
 SOIL 205. Soil Science (4)

Experiential Learning

HORT 403 or HORT 410. Thesis/Internship (6-12)
 HORT 407. Senior Seminar (1)

Ecology

HORT 318. ^Applied Ecology of Managed Ecosystems (3)

Technology

HORT 414. Information Systems in Agriculture (4)

Writing Intensive Course (WIC)

HORT 318. ^Applied Ecology of Managed Ecosystems (3)

Capstone

HORT 495. Horticultural Management Plans (3)

Option Requirements

Horticultural Science

HORT 112. Introduction to Horticultural Systems, Practices and Careers (2)
 HORT 301. The Biology of Horticulture (3)
 HORT 311. Plant Propagation (4)
 HORT 316. Plant Nutrition (4)
 HORT 411. Horticulture Book Club (1)
 HORT 412. Career Exploration: Internships and Research Projects (1)

Plant Materials

Select 2 courses from the following:

HORT 226. Landscape Plant Materials I: Deciduous Hardwoods and Conifers (4)
 HORT 228. Landscape Plant Materials II: Spring Flowering Trees & Shrubs (4)
 HORT 251. Temperate Tree Fruit, Berries, Grapes, and Nuts (2)
 HORT 255. Herbaceous Ornamental Plant Materials (3)**Ecampus only**
 HORT 433. Systematics and Adaptation of Vegetable Crops (4)

a) Horticultural Science and Technology (Select 3 courses from the following)

ENT 322. Honey Bee Biology and Beekeeping (3)
 HORT 260. Organic Farming and Gardening (3)
 HORT 285. Permaculture Design and Theory: Certificate Course (4)
 HORT 314. Principles of Turfgrass Maintenance (4)
 HORT 315. Sustainable Landscapes: Maintenance, Conservation, Restore (4)
 HORT/FES 350. Urban Forestry (3)
Ecampus only
 HORT 351. Floriculture and Greenhouse Systems (4)
 HORT 358. Landscape Construction Techniques (4)
 HORT 360. Landscape Construction: Irrigation and Drainage (4)
 HORT 361. Plant Nursery Systems (4)

HORT 380. Sustainable Landscape Design (3)

b) Social Sciences

HORT 270. Introduction to Therapeutic Horticulture (2)
 HORT 271. Techniques and Adaptive Strategies in Therapeutic Horticulture(2)
 HORT 272. Basic Therapeutic Skills I (2)
 HORT 273. Basic Therapeutic Skills II (2)
 HORT 274. Therapeutic Horticultural Programs for Older Adults/Children (2)
 HORT 275. Therapeutic Garden Design, Maintenance and Programming (2)
 PSY 201. *General Psychology (3)
 PSY 202. *General Psychology (3)
 SOC 204. *Introduction to Sociology (3)

(Select 3 additional courses from the following)

HDFS 311. Infant and Child Development (4)
 HDFS 313. Adolescent Development (4)
 HDFS 314. Adult Development and Aging (4)
 PSY 330. Brain and Behavior (4)
 PSY 350. Human Lifespan Development (4)
 PSY 381. Abnormal Psychology (4)
 PSY 432. Physiological Psychology (4)
 PSY 433. Psychopharmacology (4)
 PSY 485. Behavior Modification (4)
 PSY 498. Health Psychology (4)
 PSY 499. Special Topics: Stress and Coping (3)
 SOC 350. Health, Illness and Society (4)
 SOC 432. Sociology of Aging (3)
 SOC 439. Welfare and Social Services (4)
 SOC 440. Juvenile Delinquency (4)
 SOC 442. Sociology of Drug Use and Abuse (4)

Synthesis/Upper Division

Each course must be from a different department.

Contemporary Global Issues (Select one of the following courses)

AREC 351. *Natural Resource Economics and Policy (3)
 AREC 461. ^Agricultural and Food Policy Issues (4)
 BI 301. *Human Impacts on Ecosystems (3)
 BI 306. *^Environmental Ecology (3)
 BI 349. *Biodiversity: Causes, Consequences and Conservation (3)
 CROP 330. *World Food Crops (3)
 FES 365. *Issues in Natural Resources Conservation (3)
 FW 325. *Global Crises in Resource Ecology (3)
 GEO 300. *Sustainability for the Common Good (3)
 GEO 330. *^Geography of International Development and Globalization (3)
Science, Technology and Society (Select 1 of the following courses)
 ANS 315. *Contentious Social Issues in Animal Agriculture (3)
 AREC 352. *Environmental Economics and Policy (3)
 BI/FES 435. *Genes and Chemicals in Agriculture: Value and Risk (3)
 CH 374. *Technology, Energy, and Risk (3)
 CSS/SOIL 395. *World Soil Resources (3)
 ENGR 350. *Sustainable Engineering (3)
 ENSC 479. *^Environmental Case Studies (3)
 FST 421. *Food Law (3)
 FW 485. *Consensus and Natural Resources (3)
 GEO 300. *Sustainability for the Common Good (3)

GEO 335. *Introduction to Water Science and Policy (3)
 HST 481. *Environmental History of the United States (4)
 HSTS 421. *Technology and Change (4)
 HSTS 470. *Ecology and History: Landscapes of the Columbia Basin (3)
 NUTR 312. *Issues in Nutrition and Health (3)
 PH 313. *Energy Alternatives (3)
 PS 476. *Science and Politics (4)
 RNG 477. *Agroforestry (3)
 Z 348. *Human Ecology (3)

Research Track (optional)

HORT 406. Projects: Data Presentations (1)
 MTH 251. *Differential Calculus (4)
 MTH 252. Integral Calculus (4)
 ST 351. Introduction to Statistical Methods (4)

Select 3 of the following:

BB 350. Elementary Biochemistry (4)
 BI 370. Ecology (3)
 BOT 341. Plant Ecology (4)
 CH 331. Organic Chemistry (4)
 CH 332. Organic Chemistry (4)
 CH 337. Organic Chemistry Laboratory (4)
 MB 230. Introductory Microbiology (4)
 PH 201. *General Physics (5)
 PH 202. *General Physics (5)

Grade Requirements

Students pursuing a major or minor in horticulture are required to receive a grade of C– or better in all HORT (horticulture) and PBG (plant breeding and genetics) courses that are required for completion of their major and option, or minor. If a grade below C– is received in a HORT or PBG course required for their major and option, or minor, a student will need to re-take the course and receive a grade of C– or better. If the grade below a C– was received for a course that is part of a group of courses where the student can select which courses to take (i.e., they do not need to take all of the courses, just a specified number of courses or credits) then it would be acceptable for the student to substitute a course for the one that they had received a grade below a C–. For example, in most of our options, a student needs to complete three of four plant identification courses. If a student received a grade lower than a C– in one of the classes, they could either re-take the same course or complete the other three courses with a grade of C– or better.

Footnotes:

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

TURF MANAGEMENT OPTION

Turf is the central feature of golf courses, sports fields, parks, cemeteries, and landscapes in cities and neighborhoods throughout the United States. More than 200 golf course superintendents in Oregon and 1,500 in Washington, California, and Idaho manage turf as the focal

point of their facilities. Professional lawn care is a thriving industry in Oregon communities that is complemented by a vibrant sports turf and grass seed industry, all of which adds millions of dollars to local economies. This continually growing industry offers more career track jobs than any other area in horticulture.

Students in turf management become golf course superintendents, athletic field and park managers, and lawn care professionals with commensurate responsibilities and salaries. Students in this curriculum must have a passion for the outdoors, for turf maintenance, and for working with other people in a team context. Prior practical work experience and a willingness to work summers and/or extended internships while at OSU is a characteristic shared by our students. The curriculum focuses on science, technology, ‘in-field’ hands-on experience, and decision making in real world settings. Active participation in student clubs, class field labs, and out-of-class internship work experiences is critical to success. Activities stress networking and exposure to multiple work environments to help students integrate quickly into the industry.

Major Core Requirements

General Science

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

Choose 1 of the following chemistry series:

CH 121. General Chemistry (5) **and**
 CH 122, CH 123. *General Chemistry (5,5)

OR

CH 231, CH 232, CH 233. *General Chemistry (4,4,4)
and CH 261, CH 262, CH 263.
 *Laboratory for Chemistry 231, 232, 233 (1,1,1)

MTH 112. *Elementary Functions (4)
 or MTH 241. *Calculus for Management and Social Science (4)
 or MTH 245. *Calculus for Management, Life, and Social Sciences (4)

Orientation

HORT/SOIL 101. Introduction to Horticulture, Crop, Soil, and Insect Science (1)

Agricultural Science

BOT 331. Plant Physiology (4)
 BOT 350. Introductory Plant Pathology (4)
 CROP 440. Weed Management (4)
 ENT 311. Introduction to Insect Pest Management (4)
 SOIL 205. *Soil Science (4)

Experiential Learning

HORT 403 or 410. Thesis/Internship (6–12)
 HORT 407. Senior Seminar (1)

Ecology

HORT 318. ^Applied Ecology of Managed Ecosystems (3)

Technology

AG 312. Engine Theory and Operation (3)

Writing Intensive Course (WIC)

HORT 318. ^Applied Ecology of Managed Ecosystems (3)

Capstone

HORT 418. Golf Course Maintenance (4)

Option Requirements

Horticultural Sciences

HORT 112. Introduction to Horticultural Systems, Practices and Careers (2)
 HORT 301. The Biology of Horticulture (3)
 HORT 311. Plant Propagation (4)
 HORT 316. Plant Nutrition (4)
 HORT 411. Horticulture Book Club (1)
 HORT 412. Career Exploration: Internships and Research Projects (1)

Plant Materials

HORT 226. Landscape Plant Materials I: Deciduous Hardwoods and Conifers (4)
 HORT 228. Landscape Plant Materials II: Spring Flowering Trees and Shrubs (4)

Horticultural Science and Technology

GEO 335. *Introduction to Water Science and Policy (3)
 HORT 314. Principles of Turfgrass Maintenance (4)
 HORT 315. Sustainable Landscapes: Maintenance, Conservation, Restore (4)
 HORT 358. Landscape Construction Techniques (4)
 HORT 360. Landscape Construction: Irrigation and Drainage (4)

Select 3 of the following courses:

AG 221. Metals and Welding (3)
 HORT/FES 350. Urban Forestry (3)

Ecampus only

HORT 351. Floriculture and Greenhouse Systems (4)
 HORT 380. Sustainable Landscape Design (3)
 HORT/FES 447. Arboriculture (4) **Ecampus only**
 HORT/FES 455. Urban Forest Planning, Policy, and Management (4) **Ecampus only**.

Business Management

Select 1 course from the following:

AREC 211. Management in Agriculture (4)
 BA 215. Fundamentals of Accounting (4)
 BA 260. Introduction to Entrepreneurship (4)
 BA 463. Family Business Management (4)

Synthesis/Upper Division

Each course must be from a different department.

Contemporary Global Issues: Select 1 of the following courses:

AREC 351. *Natural Resource Economics and Policy (3)
 AREC 461. ^Agricultural and Food Policy Issues (4)
 BI 301. *Human Impacts on Ecosystems (3)
 BI 306. *Environmental Ecology (3)
 BI 349. *Biodiversity: Causes, Consequences and Conservation (3)
 CROP 330. *World Food Crops (3)
 FES 365. *Issues in Natural Resources Conservation (3)
 FW 325. *Global Crises in Resource Ecology (3)
 GEO 300. *Sustainability for the Common Good (3)

GEO 330. ^{*}Geography of International Development and Globalization (3)

Science, Technology and Society, Select 1 of the following courses:

ANS 315. ^{*}Contentious Social Issues in Animal Agriculture (3)
 AREC 352. ^{*}Environmental Economics and Policy (3)
 BI/FES 435. ^{*}Genes and Chemicals in Agriculture: Value and Risk (3)
 CH 374. ^{*}Technology, Energy, and Risk (3)
 CSS/SOIL 395. ^{*}World Soil Resources (3)
 ENGR 350. ^{*}Sustainable Engineering (3)
 ENSC 479. ^{**}Environmental Case Studies (3)
 FST 421. ^{*}Food Law (3)
 FW 485. ^{*}Consensus and Natural Resources (3)
 GEO 300. ^{*}Sustainability for the Common Good (3)
 GEO 335. ^{*}Introduction to Water Science and Policy (3)
 HST 481. ^{*}Environmental History of the United States (4)
 HSTS 421. ^{*}Technology and Change (4)
 HSTS 470. ^{*}Ecology and History: Landscapes of the Columbia Basin (3)
 NUTR 312. ^{*}Issues in Nutrition and Health (3)
 PH 313. ^{*}Energy Alternatives (3)
 PS 476. ^{*}Science and Politics (4)
 RNG 477. ^{*}Agroforestry (3)
 Z 348. ^{*}Human Ecology (3)

Research Track (optional)

HORT 406. Projects: Data Presentations (1)
 MTH 251. ^{*}Differential Calculus (4)
 MTH 252. Integral Calculus (4)
 ST 351. Introduction to Statistical Methods (4)

Select 3 of the following:

BB 350. Elementary Biochemistry (4)
 BI 370. Ecology (3)
 BOT 341. Plant Ecology (4)
 CH 331. Organic Chemistry (4)
 CH 332. Organic Chemistry (4)
 CH 337. Organic Chemistry Laboratory (4)
 MB 230. Introductory Microbiology (4)
 PH 201. ^{*}General Physics (5)
 PH 202. ^{*}General Physics (5)

Grade Requirements

Students pursuing a major or minor in horticulture are required to receive a grade of C- or better in all HORT (horticulture) and PBG (plant breeding and genetics) courses that are required for completion of their major and option, or minor. If a grade below C- is received in a HORT or PBG course required for their major and option, or minor, a student will need to re-take the course and receive a grade of C- or better. If the grade below a C- was received for a course that is part of a group of courses where the student can select which courses to take (i.e., they do not need to take all of the courses, just a specified number of courses or credits) then it would be acceptable for the student to substitute a course for the one that they had received a grade below a C-. For example, in most of our options, a student needs to complete

three of four plant identification courses. If a student received a grade lower than a C- in one of the classes, they could either re-take the same course or complete the other three courses with a grade of C- or better.

Footnotes:

^{*} Baccalaureate Core Course
[^] Writing Intensive Course (WIC)

VITICULTURE AND ENOLOGY OPTION

The Oregon winegrape industry has experienced steady growth since its beginning in 1961. Oregon now ranks third nationally in number of wineries, and fourth in wine production and vineyard acreage. Vineyards and wineries have also become an integral part of the Oregon tourism industry.

The viticulture and enology curriculum addresses the educational needs of students planning to enter the winegrape industry as viticulturists, vineyard managers, consultants and professionals. The curriculum involves active learning, providing case studies about real-world situations, enhancing critical thinking skills through understanding the art and science of vineyard and winery production. Viticulture and enology students will be active learners in a multi-disciplinary major. Upon graduation, they will possess the skills prized by employers as managers with the ability to think critically and troubleshoot in the vineyard and winery. They will have a thorough knowledge of vine physiology, vineyard production, winery production and related topics. They will understand how their actions in the field affect the quality of the finished wine. They will be skilled in finding resources and using information to analyze novel situations and solve problems in the industry.

Major Core

General Science

BI 211, BI 212, BI 213. ^{*}Principles of Biology (4,4,4)

Choose 1 of the following chemistry series:

CH 121. General Chemistry (5) **and**
 CH 122, CH 123. ^{*}General Chemistry (5,5)

OR:

CH 231, CH 232, CH 233. ^{*}General Chemistry (4,4,4) **and** CH 261, CH 262, CH 263. ^{*}Laboratory for Chemistry 231, 232, 233 (1,1,1)

MTH 112. ^{*}Elementary Functions (4)
 or MTH 241. ^{*}Calculus for Management and Social Science (4)
 or MTH 245. ^{*}Calculus for Management, Life, and Social Sciences (4)

Orientation

HORT/SOIL 101. Introduction to Horticulture, Crop, Soil, and Insect Science (1)

Agricultural Science

BOT 331. Plant Physiology (4)
 BOT 350. Introductory Plant Pathology (4)

CROP 440. Weed Management (4)
 ENT 311. Introduction to Insect Pest Management (4)
 SOIL 205. ^{*}Soil Science (4)

Experiential Learning

HORT 403. Thesis (6-12 credits)
 or HORT 410. Internship (6-12 credits)
 HORT 407. Seminar (1)

Ecology

Select 1 of the following courses:

BI 370. Ecology (3)
 BOT 341. Plant Ecology (4)
 HORT 318. [^]Applied Ecology of Managed Ecosystems (3)

Technology

PBG 430. Plant Genetics (3)

Writing Intensive Course

Select 1 of the following courses:

CSS/SOIL 325. [^]Ag and Environmental Predicaments: A Case Study Approach (3)
 HORT 318. [^]Applied Ecology of Managed Ecosystems (3)

Capstone

HORT 480. Case Studies in Cropping Systems Management (4)

Option Requirements

Horticultural Science

HORT 112. Introduction to Horticultural Systems, Practices and Careers (2)
 HORT 301. The Biology of Horticulture (3)
 HORT 311. Plant Propagation (4)
 HORT 316. Plant Nutrition (4)
 HORT 411. Horticulture Book Club (1)
 HORT 412. Career Exploration (1)

Plant Materials

HORT 251. Temperate Tree Fruits, Berries, Grapes, and Nuts (2)

Horticultural Science and Technology

Select 1 of the following courses:

AG 221. Metals and Welding (3)
 AG 312. Engine Theory and Operation (3)
 AG 391. Farm Implements (3)
 AG 425. Developments in Agricultural Mechanics (3)
 HORT 414. Information Systems in Agriculture (4)
 HORT 495. Horticultural Management Plans (3)
 PBG 450. Plant Breeding (4)
 SOIL 475. Soil Resource Potentials (4)

Viticulture

HORT 452. Berry and Grape Physiology and Culture (4)
 HORT 453. Grapevine Growth and Physiology (3)
 HORT 454. Principles and Practices of Vineyard Production (3)

Fermentation Foundation Sciences

CH 331. Organic Chemistry (4)
 CH 332. Organic Chemistry (4)
 MB 302. General Microbiology (3)
 BB 350. Elementary Biochemistry (4)
 or BI 314. Cell and Molecular Biology (4)

Fermentation Science

FST 466. Wine Production Principles (3)
 FST 467. Wine Production, Analysis, and Sensory Evaluation (5)

Business Management**Select 1 of the following courses:**

AREC 211. Management in Agriculture (4)
 BA 215. Fundamentals of Accounting (4)
 BA 260. Introduction to Entrepreneurship (4)
 BA 463. Family Business Management (4)

Ecology and Sustainability Ecosystems Courses

Meets Synthesis requirements. Each course must be from a different department.

Contemporary Global Issues**Select 1 of the following courses:**

AREC 351. *Natural Resource Economics and Policy (3)
 AREC 461. ^Agricultural and Food Policy Issues (4)
 BI 301. *Human Impacts on Ecosystems (3)
 BI 306. *^Environmental Ecology (3)
 BI 349. *Biodiversity: Causes, Consequences and Conservation (3)
 CROP 330. *World Food Crops (3)
 FES 365. *Issues in Natural Resources Conservation (3)
 FW 325. *Global Crises in Resource Ecology (3)
 GEO 300. *Sustainability for the Common Good (3)
 GEO 330. *^Geography of International Development and Globalization (3)

Science, Technology and Society**Select 1 of the following courses:**

ANS 315. *Contentious Social Issues in Animal Agriculture (3)
 AREC 352. *Environmental Economics and Policy (3)
 BI/FES 435. *Genes and Chemicals in Agriculture: Value and Risk (3)
 CH 374. *Technology, Energy, and Risk (3)
 CSS/SOIL 395. *World Soil Resources (3)
 ENGR 350. *Sustainable Engineering (3)
 ENSC 479. *^Environmental Case Studies (3)
 FST 421. *Food Law (3)
 FW 485. *Consensus and Natural Resources (3)
 GEO 300. *Sustainability for the Common Good (3)
 GEO 335. *Introduction to Water Science and Policy (3)
 HST 481. *Environmental History of the United States (4)
 HSTS 421. *Technology and Change (4)
 HSTS 470. *Ecology and History: Landscapes of the Columbia Basin (3)
 NUTR 312. *Issues in Nutrition and Health (3)
 PH 313. *Energy Alternatives (3)
 PS 476. *Science and Politics (4)
 RNG 477. *Agroforestry (3)
 Z 348. *Human Ecology (3)

Research Track (optional)

HORT 406. Projects: Data Presentations (1)
 MTH 251. *Differential Calculus (4)
 MTH 252. Integral Calculus (4)
 ST 351. Introduction to Statistical Methods (4)

Select 3 of the following:

BB 350. Elementary Biochemistry (4)
 BI 370. Ecology (3)
 BOT 341. Plant Ecology (4)
 CH 331. Organic Chemistry (4)
 CH 332. Organic Chemistry (4)
 CH 337. Organic Chemistry Laboratory (4)

MB 230. Introductory Microbiology (4)
 PH 201. *General Physics (5)
 PH 202. *General Physics (5)

Grade Requirement

Students pursuing a major or minor in horticulture are required to receive a grade of C– or better in all HORT (horticulture) and PBG (plant breeding and genetics) courses that are required for completion of their major and option, or minor. If a grade below C– is received in a HORT or PBG course required for their major and option, or minor, a student will need to re-take the course and receive a grade of C– or better. If the grade below a C– was received for a course that is part of a group of courses where the student can select which courses to take (i.e., they do not need to take all of the courses, just a specified number of courses or credits) then it would be acceptable for the student to substitute a course for the one that they had received a grade below a C–. For example, in most of our options, a student needs to complete three of four plant identification courses. If a student received a grade lower than a C– in one of the classes, they could either re-take the same course or complete the other three courses with a grade of C– or better.

Footnotes:

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

UNDERGRADUATE MINORS**HORTICULTURE MINOR****Also available via Ecampus.**

The Horticulture minor is an effective way for students, including majors outside the College of Agricultural Sciences, to meet their interests. The goals of students minoring in horticulture may vary widely. With just 5 credits in the minor core, students will be able to tailor their additional horticulture course work to personal goals.

HORT 112. Introduction to Horticultural Systems, Practices and Careers (2)
 HORT 301. The Biology of Horticulture (3)
 Additional HORT credits (22) (*At least 10 must be upper division*)

Course selection must be approved by the departmental academic advisor.

Total=27 credits

Students are required to earn a grade of C– or better in all HORT courses taken to complete the minor.

TURF AND LANDSCAPE MANAGEMENT MINOR

The Turf and Landscape Management minor is an effective way for students, including majors outside the College of Agricultural Sciences, to meet their interests. The two areas of focus, turf or landscape, allow students to tailor their course work to personal goals.

Requirements

CSS/SOIL 205. *Soil Science (4)
 HORT 112. Introduction to Horticultural Systems, Practices and Careers (2)
 HORT 301. The Biology of Horticulture (3)

Plus courses listed under Turf Focus or Landscape Focus**Turf Focus**

HORT 314. Principles of Turfgrass Maintenance (4)
 HORT 315. Sustainable Landscapes: Maintenance, Conservation, Restore (4)
 HORT 360. Landscape Construction: Irrigation and Drainage (4)
 HORT 405. Reading and Conference: "Turf Pest Management" (3)
 HORT 418. Golf Course Maintenance (4)

Total=28**Landscape Focus****Select two courses from the following:**

HORT 226. Landscape Plant Materials I: Deciduous Hardwoods and Conifers (4)
 HORT 228. Landscape Plant Materials II: Spring Flowering Trees and Shrubs (4)
 HORT 255. Herbaceous Ornamental Plant Materials (3)
Ecampus only

Select 10 to 11 credits from the following, to total a minimum of 27 credits:

HORT 285. Permaculture Design and Theory: Certificate Course (4)
 HORT 314. Principles of Turfgrass Maintenance (4)
 HORT 315. Sustainable Landscapes: Maintenance, Conservation, Restore (4)
 HORT 318. ^Applied Ecology of Managed Ecosystems (3)
 HORT 358. Landscape Construction Techniques (4)
 HORT 360. Landscape Construction: Irrigation and Drainage (4)
 HORT 380. Sustainable Landscape Design (3)

Total=27–28**GRADUATE MAJORS****HORTICULTURE (MAG, MS, PhD, MAIS)****Graduate Areas of Concentration**
Breeding, genetics and biotechnology; community and landscape horticultural systems; sustainable crop production

The Department of Horticulture offers graduate work leading to the Master of Agriculture (MAG), Master of Science (MS) and Doctor of Philosophy (PhD) degrees. The MS and PhD degrees culminate in original research reported in a thesis and are often pursued by students interested in research related careers, or who wish direct training in research methods. The MAG degree provides for broad training in several fields of agriculture, and is usually reserved for those not desiring the specialized research training and experience of the MS degree.

The department of Horticulture has strengths and expertise in three broad areas:

Breeding, Genetics, and Biotechnology. Faculty and students explore fundamental questions related to the control and regulation of plant traits using a variety of techniques and tools including molecular biology, genomics and bioinformatics. Faculty and students also apply fundamental knowledge to make genetic improvements to crop plants and to modify plant growth and productivity. Current breeding programs exist in berry, hazelnut and vegetable systems.

Sustainable Crop Production. Faculty and students explore basic and applied questions related to the design and management of sustainable and productive horticultural cropping and farming systems. The program integrates a diverse set of disciplines and tools including basic plant sciences, applied crop management, and field experimentation and analysis. Program areas include viticulture and enology, berries and small fruit, tree fruit and nuts, vegetables, and nursery and greenhouse production.

Community and Landscape Horticultural Systems. Faculty and students explore basic and applied questions related to the design and function of urban and community landscapes including golf courses, sports fields, gardens, parks and open space. Program areas include turf and landscape management, community food systems, pollinator ecology, and sustainable landscapes.

For more information visit our website at <http://hort.oregonstate.edu/>, contact a member of the graduate faculty or contact **John Lambrinos**, *Graduate Coordinator*, Department of Horticulture, Agricultural and Life Sciences 4017, OSU, Corvallis, OR 97331-7304, email: lambrinj@hort.oregonstate.edu.

ENTOMOLOGY GRADUATE OPTION

The Entomology (ENT) option at Oregon State University embodies the Land Grant mission of integrated research, teaching and extension in the context of understanding the basic biology of insects and with this knowledge then working with insects in natural and/or managed environments. Programs range from basic to applied and can include enhancement of environments to increase insect numbers to management of environments to diminish the numbers of insect pests. Entomologists regularly cooperate with plant scientists, physiologists, pathologists, soil scientists, genomicists, molecular biologists and experts in other fields.

Students in the Entomology option will learn an interdisciplinary approach to entomology by taking courses across a broad spectrum of disciplines. The option may be tailored to meet students' career goals including further graduate

education or directly entering public or private sector positions. After completing their degree, students will have gained fundamental knowledge in entomology that may be applied in a range of agricultural, forested, aquatic, or human environments.

Requirements

Select 12 credits from the following:

- ENT 507. Seminar (1-2)
- ENT/HORT 518. Current Topics in Entomology (2-4)
- ENT 520. Insect Ecology (3)
- ENT 542. Principles of Integrated Pest Management: Systems Design (4)
- ENT 599. Special Topics: *Explorations in OSU Entomology* (2-6)
- Z 540. Insect Physiology (3)

PLANT BREEDING AND GENETICS GRADUATE OPTION

The Plant Breeding and Genetics (PB&G) graduate option at Oregon State University embodies the Land Grant mission of integrated research, teaching and extension in the context of cultivar development and fundamental genetics. Plant breeding is a collaborative discipline spanning everything from classical field approaches to gene manipulation at the molecular level. Breeders regularly cooperate with pathologists, entomologists, soil scientists, physiologists, food scientists, genomicists, molecular biologists and experts in other fields.

Students in the Plant Breeding and Genetics graduate option will learn an interdisciplinary approach to applied plant breeding by taking courses across a broad spectrum of disciplines. The option may be tailored to meet students' career goals including further graduate study, as well as direct entry into public or private sector breeding programs. After completing the degree, students will have fundamental knowledge of plant breeding that may be applied to a range of crops including annual and perennial horticultural crops, agronomic food and feed crops, and forestry products.

Additional Requirements

Select 12 credits from the following list:

- BOT/MCB 575. Comparative Genomics (4)
- CROP 590. Experimental Design in Agriculture (4)
- PBG 507. Seminar (1-2)
- PBG/HORT 519. Current Topics in Plant Breeding and Genetics (2)
- PBG/HORT/CSS 530. Plant Genetics (3)
- PBG/HORT/MCB 541. Plant Tissue Culture (4)
- PBG/HORT/CSS 550. Plant Breeding (4)
- PBG/CSS/MCB 620. DNA Fingerprinting (1)
- PBG/CSS/MCB 621. Genetic Mapping (1)
- PBG/CSS/MCB 622. Mapping Quantitative Trait Loci (1)
- PBG 650. Advanced Plant Breeding and Quantitative Genetics (3)

HORTICULTURE GRADUATE MINOR

For more details, see the departmental advisor.

■ CROP SCIENCE COURSES

CROP 101. INTRODUCTION TO HORTICULTURE, CROP, SOIL, AND INSECT SCIENCE (1). Introduces students with interests in horticulture, crop, soil, and insect sciences to educational and professional opportunities in these disciplines. Speakers will discuss opportunities in research and academia as well as in the applied professional job market. Open to all students. CROSSLISTED as ENT 101, HORT 101, SOIL 101.

CROP 199. SPECIAL STUDIES: ISSUES IN SUSTAINABLE AGRICULTURE (1-16). Invited speakers present seminars on specific aspects of agriculture relating to sustainability. Topics vary from term to term and year to year. May be repeated for credit when topics differ. This course is repeatable for a maximum of 16 credits.

CROP 199H. SPECIAL STUDIES: ISSUES IN SUSTAINABLE AGRICULTURE (1-16). Invited speakers present seminars on specific aspects of agriculture relating to sustainability. Topics vary from term to term and year to year. May be repeated for credit when topics differ. This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

CROP 200. CROP ECOLOGY AND MORPHOLOGY (3). An introduction to the concepts and principles of crop ecology and morphology and a foundation for other crop science courses. Examines the dynamics and function of crop communities, and the biotic and environmental interactions that influence productivity. Fundamentals of the developmental morphology of crop seeds, seedlings, and plants. Morphological features of seeds and plants in relation to the identification of crop families and species of economic importance.

CROP 300. CROP PRODUCTION IN PACIFIC NORTHWEST AGROECOSYSTEMS (4). Relation of crop production to human culture and the natural environment. Origins of agriculture and the processes of agricultural change, and productivity and sustainability of specific crop production systems in the Pacific Northwest. History, geography, resource requirements, and key challenges faced are presented. Fundamental crop production practices in relation to productivity and sustainability. Lec/lab/rec. CROSSLISTED as HORT 300 and CSS 300. **PREREQS:** One year of general biology or equivalent.

CROP 310. FORAGE PRODUCTION (4). Importance of, and current production practices for, forage crops. Lec/lab. **PREREQS:** (CSS 300 or CROP 300 or HORT 300) and (CSS 305 or CSS 205 or SOIL 205) or equivalent

CROP 319. PRINCIPLES OF FIELD CROP PRODUCTION (3). Provides students with an understanding of the basic principles of field crop production--tillage, soil testing, fertilization, variety selection, planting, and in-season crop management. Management practices for wheat, corn and soybean as «model» crops will be discussed to assist students in preparing for a career in agriculture or the agricultural sciences. Offered odd years. **PREREQS:** CROP 300 or equivalent and SOIL 205

CROP 325. ^AG AND ENVIRONMENTAL PREDICAMENTS: A CASE STUDY APPROACH (3). Evaluation of controversial agricultural and environmental problems. Production of clear oral and written documents describing and analyzing problems and specific courses of action utilizing team-building skills. (Writing Intensive Course) CROSSLISTED as SOIL 325. **PREREQS:** (CSS 305 or CSS 205 or SOIL 205)

CROP 330. *WORLD FOOD CROPS (3). Origin, production, utilization, and improvement

of the world's major food crops. The role of crop production in global economic and social development; food security and worldwide nutritional requirements. (Bacc Core Course) **PREREQS:** CSS 200 or CROP 200 recommended.

CROP 340. *PENS AND PLOWS: WRITINGS OF WORKING THE LAND (3). A survey of literature from ancient Greece to the twentieth century focusing on the significance of agricultural life and/or the natural world. Students read and discuss writings considered critical in the development of Western culture and receive input on the literary significance and the accuracy of agriculture presented within the readings. (Bacc Core Course) Taught via Ecampus only.

CROP 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

CROP 403. THESIS (1-16). Independent, original study and preparation of a senior thesis. This course is repeatable for a maximum of 16 credits. **PREREQS:** Senior standing.

CROP 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

CROP 405H. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

CROP 407. SEMINAR (1). Senior seminar intended to instruct students on proper techniques for presentation of scientific material. Each student is expected to prepare and present a scientific seminar and to submit written documentation supporting that seminar.

CROP 410. INTERNSHIP (1-6). Professional work experience previously approved and supervised by the department, written report required. This course is repeatable for a maximum of 12 credits. **PREREQS:** Junior standing.

CROP 418. TOXIC PLANTS IN PNW PASTURES (1). Identifying and understanding ecology and biology of harmful weeds and poisonous plants found in Pacific Northwest pastures and rangelands and determining best management and control options. Taught via Ecampus only. **PREREQS:** College-level plant biology and/or taxonomy courses.

CROP 420. SEED SCIENCE AND TECHNOLOGY (3). Seed formation and factors affecting their development and maturation. Seed structure and chemical composition. Physiological and biochemical aspects of seed germination, dormancy, deterioration and storability. The concept of seed quality, its importance in agriculture, its attributes and impact on field performance. Methods of measuring seed quality of conventional and genetically modified seeds. Taught via Ecampus only. **PREREQS:** Biology, plant anatomy and/or physiology courses are recommended.

CROP 433. SYSTEMATICS AND ADAPTATION OF VEGETABLE CROPS (4). Covers the botanical and taxonomic relationships, breeding systems and adaptation of vegetable crops. Fresh material is used to illustrate varietal differences and traits of importance. Lec/lab. Offered even years. **CROSSLISTED** as HORT 433/HORT 533. **PREREQS:** (BI 102 or BI 213 or BI 311 or HORT 430 or CSS 430 or PBG 430 or HORT 450 or CSS 450 or PBG 450)

CROP 438. EXPLORING WORLD AGRICULTURE (2). Survey of crop and livestock production in a designated section of the world, including history, culture, and political situation. Course is designed to prepare students for a tour of study area. **CROSSLISTED** as ANS 438, AREC 438, CSS 438, HORT 438. Graded P/N. This course is repeatable for a maximum of 8 credits.

CROP 440. WEED MANAGEMENT (4). Principles of weed control by cultural, biological, and chemical means; weed identification; introduction

to herbicides and factors influencing their use. Lec/lab/rec. **PREREQS:** One year biological science and one course in organic chemistry.

CROP 460. SEED PRODUCTION (3). An introduction to principles and practices of seed-based genetic delivery systems. Fundamentals of seed crop biology, cultivar maintenance and production methods are stressed. Concepts are illustrated using Pacific Northwest seed crops. **PREREQS:** CROP 200 or CSS 200 or equivalent.

CROP 463. SEED BIOLOGY (3). Information about reproductive development of plants such as pollination and fertilization, which is important for the initiation of seed formation, will be provided. Embryo and endosperm development as well as accumulation of seed storage materials, which are major events during seed development, will be covered, as well as the dormancy and germination mechanisms in mature seeds. Lectures and discussions (presentations required for graduate students). Offered even years. **CROSSLISTED** as HORT 463/HORT 563. Lec/lab.

CROP 480. CASE STUDIES IN CROPPING SYSTEMS MANAGEMENT (4). Decision cases involving the production of field and horticultural crops; individual and group activities; discussion of the decision-making process. Multiple field trips required. A field trip fee will be charged. **CROSSLISTED** as HORT 480/HORT 580, CSS 480/CSS 580. **PREREQS:** CROP 300 or CSS 300 or HORT 300 and senior standing in agriculture.

CROP 499. SPECIAL TOPICS IN CROP SCIENCE AND SOIL SCIENCE (1-16). Technical knowledge and skills development courses offered in a wide array of course formats. Topics vary from term to term and year to year. May be repeated for credit when topics differ. This course is repeatable for a maximum of 16 credits.

CROP 499H. SPECIAL TOPICS IN CROP SCIENCE AND SOIL SCIENCE (1-16). Technical knowledge and skills development courses offered in a wide array of course formats. Topics vary from term to term and year to year. May be repeated for credit when topics differ. This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

CROP 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

CROP 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Masters-level graduate students.

CROP 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

CROP 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

CROP 507. SEMINAR (1). Graded P/N. This course is repeatable for a maximum of 99 credits.

CROP 509. PRACTICUM IN TEACHING (1-3). Developing skills and competence in teaching soil science under staff supervision; organization and presentation of instructional material by assisting in laboratory, recitation, and lectures. This course is repeatable for a maximum of 16 credits.

CROP 520. SEED SCIENCE AND TECHNOLOGY (3). Seed formation and factors affecting their development and maturation. Seed structure and chemical composition. Physiological and biochemical aspects of seed germination, dormancy, deterioration and storability. The concept of seed quality, its importance in agriculture, its attributes and impact on field performance. Methods of measuring seed quality of conventional and genetically modified seeds. Taught via Ecampus only. **PREREQS:** Biology, plant anatomy and/or physiology courses are recommended.

CROP 533. SYSTEMATICS AND ADAPTATION OF VEGETABLE CROPS (4). Covers the botanical and taxonomic relationships, breeding systems and adaptation of vegetable crops. Fresh

material is used to illustrate varietal differences and traits of importance. Lec/lab. **CROSSLISTED** as HORT 433/HORT 533. **PREREQS:** BI 102 or BI 213 or BI 311 or HORT 430 or CSS 430 or PBG 430 or HORT 450 or CSS 450 or PBG 450

CROP 540. WEED MANAGEMENT (4). Principles of weed control by cultural, biological, and chemical means; weed identification; introduction to herbicides and factors influencing their use. Lec/lab/rec. **PREREQS:** One year biological science and one course in organic chemistry.

CROP 560. SEED PRODUCTION (3). An introduction to principles and practices of seed-based genetic delivery systems. Fundamentals of seed crop biology, cultivar maintenance and production methods are stressed. Concepts are illustrated using Pacific Northwest seed crops. **PREREQS:** CROP 200 or CSS 200 or equivalent.

CROP 563. SEED BIOLOGY (3). Information about reproductive development of plants such as pollination and fertilization, which is important for the initiation of seed formation, will be provided. Embryo and endosperm development as well as accumulation of seed storage materials, which are major events during seed development, will be covered, as well as the dormancy and germination mechanisms in mature seeds. Lectures and discussions (presentations required for graduate students). Offered even years. **CROSSLISTED** as HORT 463/HORT 563. Lec/lab.

CROP 580. CASE STUDIES IN CROPPING SYSTEMS MANAGEMENT (4). Decision cases involving the production of field and horticultural crops; individual and group activities; discussion of the decision-making process. Multiple field trips required. A field trip fee will be charged. **CROSSLISTED** as HORT 480/HORT 580, CSS 480/CSS 580. **PREREQS:** CROP 300 or CSS 300 or HORT 300 and senior standing in agriculture.

CROP 590. EXPERIMENTAL DESIGN IN AGRICULTURE (4). Field layout, analysis, and interpretation of basic experimental designs used in agronomy and plant breeding and including field plot techniques such as optimum plot size and shape, factorial arrangement, replication, sub-sampling, randomization, and blocking. Recitation provides practical experience with SAS. **PREREQS:** ST 351 or equivalent.

CROP 599. SPECIAL TOPICS IN CROP SCIENCE AND SOIL SCIENCE (1-16). Technical knowledge and skills development courses offered in a wide variety of course formats. Topics vary from term to term and year to year. May be repeated for credit when topics differ. This course is repeatable for a maximum of 16 credits.

CROP 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

CROP 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** PhD-level graduate students.

CROP 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

CROP 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

CROP 607. SEMINAR (1). Graded P/N. This course is repeatable for a maximum of 99 credits.

CROP 608. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

CROP 660. HERBICIDE SCIENCE (4). Absorption, movement, and mechanism of action in plants; behavior of herbicides in soil. Offered alternate years. **PREREQS:** BOT 331 and (CSS 440 or CSS 540 or CROP 440 or CROP 540)

CROP 670. PHYSIOLOGY OF CROP YIELD (3). Concepts of crop growth and production in relation to environmental and physiological factors and their interactions; current literature. **PREREQS:** BOT 331 or equivalent.

CROP 699. SPECIAL TOPICS IN CROP SCIENCE AND SOIL SCIENCE (1-16). This course is repeatable for a maximum of 16 credits.

■ HORTICULTURE COURSES

HORT 101. INTRODUCTION TO HORTICULTURE, CROP, SOIL, AND INSECT SCIENCE (1). Introduces students with interests in horticulture, crop, soil, and insect sciences to educational and professional opportunities in these disciplines. Speakers will discuss opportunities in research and academia as well as in the applied professional job market. Open to all students. **CROSSLISTED** as CROP 101, ENT 101, SOIL 101.

HORT 111. INTRODUCTION TO HORTICULTURAL CROP PRODUCTION (2). Characteristics of commercial horticulture; survey of commercial horticultural systems with emphasis on the Pacific Northwest; career opportunities in horticulture. Required field trips.

HORT 112. INTRODUCTION TO HORTICULTURAL SYSTEMS, PRACTICES AND CAREERS (2). Overview of horticultural systems and practices, with an emphasis on the Pacific Northwest. Exploration of career opportunities in horticulture. Includes viticulture, environmental landscaping, turf management, greenhouse and nursery production, farming, education, and research. Required field trips.

HORT 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

HORT 199H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

HORT 226. LANDSCAPE PLANT MATERIALS I: DECIDUOUS HARDWOODS AND CONIFER (4). Identification of trees, shrubs, vines, and ground covers used in landscape horticulture. Basic plant taxonomy, nomenclature, anatomy, and use of plants in the landscape. Diverse plant material covered with an emphasis on deciduous hardwoods and conifers.

HORT 228. LANDSCAPE PLANT MATERIALS II: SPRING FLOWERING TREES & SHRUB (4). Identification of trees, shrubs, vines, and ground covers used in landscape horticulture. Basic plant taxonomy, nomenclature, anatomy, and use of plants in the landscape. Diverse plant material covered with an emphasis on spring flowering trees and shrubs. **Lec/rec.**

HORT 251. TEMPERATE TREE FRUIT, BERRIES, GRAPES, AND NUTS (2). Covers fruit and nut crops for temperate zones. Emphasis placed on scientific and common names, plant adaptation, basic morphology, major cultivars, and markets. Offered alternate years.

HORT 255. HERBACEOUS ORNAMENTAL PLANT MATERIALS (3). Identification and culture of herbaceous plants used in the landscape. Offered via Ecampus only.

HORT 260. ORGANIC FARMING AND GARDENING (3). Organic farming and gardening methods are discussed in class and practiced in the field. The philosophical background of organic farming as well as the biological, environmental and social factors involved in organic food production are covered. Emphasis is on hands-on application of scientific principles to create sustainable food production systems. **Lec/lab.**

HORT 270. INTRODUCTION TO THERAPEUTIC HORTICULTURE (2). An introduction to the history, benefits, and methods of therapeutic horticulture. Surveys program models for vocational, social/recreational, wellness and therapeutic applications of horticulture.

HORT 271. TECHNIQUES & ADAPTIVE STRATEGIES IN THERAPEUTIC HORTICULTURE (2). An introduction to the characteristics of therapeutic gardens. Survey of year-round, indoor and outdoor therapeutic

horticultural programming adaptations, strategies and techniques for different special populations. **PREREQS:** HORT 270

HORT 272. BASIC THERAPEUTIC SKILLS I (2). The assessment and evaluation process in therapeutic horticulture. Development of communication strategies, helping skills, and horticultural skills for therapeutic situations. **PREREQS:** HORT 271

HORT 273. BASIC THERAPEUTIC SKILLS II (2). Assessment and documentation tools in therapeutic horticulture. Treatment issues related to different types of physical and mental issues. Conduct and evaluate therapeutic horticultural activity sessions. **PREREQS:** HORT 272

HORT 274. THERAPEUTIC HORTICULTURAL PROGRAMS FOR OLDER ADULTS/CHILDREN (2). Benefits and applications of therapeutic horticulture to older adults and special needs children. **PREREQS:** HORT 273

HORT 275. THERAPEUTIC GARDEN DESIGN, MAINTENANCE AND PROGRAMMING (2). The history, characteristics and design of the therapeutic garden. The use of the garden in therapeutic horticultural programming. **PREREQS:** (HORT 274 and HORT 280)

HORT 285. PERMACULTURE DESIGN AND THEORY: CERTIFICATE COURSE (4). Permaculture design course meets internationally recognized standards for certification. Lectures, hands-on activities, experiential learning, group discussions, readings, student projects and presentations. Two mandatory weekend days. Design intensive, utilizing graphic and verbal presentation skills. Research into other functioning permaculture systems through literature, websites, and as observed on field trips. **Lec/lab.** This course is repeatable for a maximum of 8 credits.

HORT 286. PERMACULTURE CERTIFICATION (1). Permaculture Designer's Certificate issued upon completion by Cascadia Permaculture Institute. Lectures, activities, experiential learning, discussions, readings, projects, presentations. Two mandatory weekend day field trips. Design intensive, utilizing graphic and verbal presentation skills. Research functioning permaculture systems as found in literature, websites, observed on field trips. **COREQS:** HORT 285

HORT 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

HORT 299H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

HORT 300. CROP PRODUCTION IN PACIFIC NORTHWEST AGROECOSYSTEMS (4). Relation of crop production to human culture and the natural environment. Origins of agriculture and the processes of agricultural change, and productivity and sustainability of specific crop production systems in the Pacific Northwest. History, geography, resource requirements, and key challenges faced are presented. Fundamental crop production practices in relation to productivity and sustainability. **Lec/lab/rec.** **CROSSLISTED** as CSS 300 and CROP 300. **PREREQS:** One year of general biology or equivalent.

HORT 301. THE BIOLOGY OF HORTICULTURE (3). Gain fundamental knowledge of plant growth and development of horticultural crops and understand how manipulation of growth systems affects growth and development. The course will progress from a micro- to macro-level, the last section covering how environmental factors affect growth and development. **PREREQS:** General biology or botany sequence.

HORT 303. HORTICULTURAL PROJECTS (2). Student-managed crop production projects with emphasis on container grown, greenhouse crops. Crop scheduling, propagation and planting, selecting temperature and lighting regimes, specifying growth regulator applications, nutrient management, irrigation management, pest

monitoring, and problem diagnosis and correction. **PREREQS:** HORT 301

HORT 311. PLANT PROPAGATION (4). The regeneration of plants from vegetative and reproductive tissue and organs. Horticultural and physiological principles, methods, and techniques for laboratory, greenhouse nursery, field, and orchard. **PREREQS:** HORT 301

HORT 314. PRINCIPLES OF TURFGRASS MAINTENANCE (4). Identification and adaptation of common turfgrasses. Physiology of turfgrass growth and response to cultural and environmental stresses. Cultural practices including establishment, general maintenance, and pest control. Field trips required. **PREREQS:** (CSS 205 or CSS 305 or SOIL 205)

HORT 315. SUSTAINABLE LANDSCAPES: MAINTENANCE, CONSERVATION, RESTORE (4). Sustainable care and maintenance practices for non-turf landscape areas. Low input pruning, planting, fertilization, and pest control with an emphasis on IPM. Plant responses to stress, particularly those encountered in the urban environment. Outdoor labs required. **PREREQS:** Basic knowledge of plant physiology is recommended.

HORT 316. PLANT NUTRITION (4). Basic concepts and principles of plant mineral nutrition that provide a basis for solving practical nutritional problems in horticultural crops. Areas covered include mineral nutrients, nutrient availability in the soil and plant uptake, nutrient deficiencies and toxicities and their causes and remedies, and plant and soil analysis. **Lec/lab/rec.** **PREREQS:** (CSS 205 or CSS 305 or SOIL 205)

HORT 318. ^APPLIED ECOLOGY OF MANAGED ECOSYSTEMS (3). Survey of ecological processes in managed ecosystems emphasizing ecological management techniques. Ecosystem services; biodiversity management; weed dynamics; agroecology; urban ecology; restoration and mitigation; landscape management. Field trip required. (Writing Intensive Course)

HORT 319. RESTORATION HORTICULTURE (3). As world population increases to some 9 billion plus by 2044, the importance of ecologically sound horticultural practices becomes increasingly apparent. Integration of ecological concepts and theory in management and development of created landscapes is critical for the preservation of many ecological services currently provided by undeveloped areas. Offered via Ecampus only. **PREREQS:** WR 121 or equivalent. Students must be reasonably proficient in writing skills and able to communicate through writing. Basic ecology course or practical experience providing understanding of ecological principals and concepts.

HORT 330. *PLAGUES, PESTS, AND POLITICS (3). Integration and interaction of agricultural and public health aspects of entomology in society and history. **CROSSLISTED** as BI 300 and ENT 300. (Bacc Core Course)

HORT 331. *POLLINATORS IN PERIL (3). Pollinators, human influences on pollination systems, and the potential consequences of pollinator decline. An introduction to the skills needed to investigate media reports and multidisciplinary scientific research. Effects of pesticides, habitat fragmentation, climate change, invasive species, pests, pathogens, and other threats to pollinators in critical natural and agricultural systems around the world. **PREREQS:** Completion of a Baccalaureate Core biological science course. **CROSSLISTED** as ENT 331. (Bacc Core Course)

HORT 349. DIAGNOSING PLANT PROBLEMS (3). Basic principles of problem diagnosis in crop, garden, and landscape plants are covered. Problems caused by cultural and environmental issues, plant diseases, insect pests, and other causes are addressed. Students will gain

familiarity with resources for plant problem diagnosis. Offered via Ecampus only. **PREREQS:** A background in basic biology, plant pathology and/or entomology is recommended. Enrollees from outside the university setting may have gained their experience within a job or other practical setting.

HORT 350. URBAN FORESTRY (3). Introduction to principles and practices of planting and managing trees as a system of urban environment; understanding the economic, environmental, social aspects of urban forests, and an overview of contemporary land use issues and societal perspectives between people and plants. **CROSSLISTED** as FES 350. Offered via Ecampus only. **PREREQS:** Foundational forestry and horticulture courses are recommended.

HORT 351. FLORICULTURE AND GREENHOUSE SYSTEMS (4). For students interested in growing plants in commercial or educational greenhouses. Actively explores the production and scheduling of floriculture crops for various markets. Combines the practical aspects of growing floral crops under environments created by traditional and technologically advanced greenhouses. Greenhouse structures and crop environment manipulation will be emphasized. Students actively manage a floriculture crop and are responsible for developing and implementing production schedules, and for making key decisions on the culture of diverse floral crops. **PREREQS:** HORT 301

HORT 358. LANDSCAPE CONSTRUCTION TECHNIQUES (4). Study of landscape construction process from initial site analysis to finished landscape. Techniques used in building hardscape and landscape areas. Field trips required. Lec/lab.

HORT 360. LANDSCAPE CONSTRUCTION: IRRIGATION AND DRAINAGE (4). Surface grading/drainage techniques and structures; principles and techniques of landscape and turf irrigation. Field trips required. Lec/lab. **PREREQS:** HORT 358 and CSS 305

HORT 361. PLANT NURSERY SYSTEMS (4). Covers how to grow shrubs and trees, and herbaceous annuals and perennials in nurseries for use in urban landscapes and managed ecosystems such as forestry and restoration. Plant nursery systems are diverse and require intensive management involving a dynamic decision making process. This course actively explores field and container production systems as well as the marketing of plants, an overview of plant growth regulation and post-production handling, the influence of efficient production practices on plant quality, integrating pest management strategies, and natural resource utilization. **PREREQS:** HORT 301

HORT 380. SUSTAINABLE LANDSCAPE DESIGN (3). The assessment of design problems/situations, the development of solutions and the communication of those solutions to the client through the design. Specific topics include designing for ecosystem maintenance/enhancement, introduction to computer-aided design (CAD), using color in landscape designs and rendering section/elevation views.

HORT 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

HORT 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

HORT 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Junior standing. Departmental approval required.

HORT 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

HORT 405H. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

HORT 406. PROJECTS: DATA PRESENTATIONS (1). For any student doing research, to learn to develop and evaluate poster and slide presentations containing scientific data. Students are exposed to a variety of scientific disciplines as they prepare and critique their own and other students' posters and oral presentations. Students improve written and oral communication skills. Letter grade is based on participation, improvement, and the quality of a final poster project and oral presentation. Offered winter term. **CROSSLISTED** as BRR 406.

HORT 407. SEMINAR (1). Senior seminar intended to instruct students on proper techniques for presentation of scientific material. Each student is expected to prepare and present a scientific seminar and to attend and evaluate the seminars given by other class members.

HORT 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

HORT 409. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

HORT 410. INTERNSHIP (1-12). Work internship to acquaint horticulture majors with the practices of the horticulture industry. Under direction of departmental internship committee. Requires approved statement of intent, submission of employer and employee evaluation forms and written report. This course is repeatable for a maximum of 12 credits. **PREREQS:** Junior standing.

HORT 411. HORTICULTURE BOOK CLUB (1). Reading and discussion of noteworthy books and associated topics relating to agriculture, society and the environment. This course is repeatable for a maximum of 2 credits. **PREREQS:** Sophomore standing.

HORT 412. CAREER EXPLORATION: INTERNSHIPS AND RESEARCH PROJECTS (1). Provides orientation to the horticulture major internship and research project requirement. Covers procedures for selecting, performing, and reporting on an internship or research project. Includes guidance and skill development valuable in the pursuit of horticultural career goals, such as cover letter and resume preparation and interviewing experience.

HORT 414. INFORMATION SYSTEMS IN AGRICULTURE (4). Introduction to precision farming tools (GIS, image processing, GPS, and computer-linked agricultural equipment). Students also complete a class project.

HORT 418. GOLF COURSE MAINTENANCE (4). Basic aspects of golf course maintenance under temperate zone conditions. Lec/lab. **PREREQS:** HORT 314

HORT 430. PLANT GENETICS (3). Introduction to the principles of plant genetics with an emphasis on the structure and function of economically important plant genomes. **CROSSLISTED** as CSS 430/CSS 530 and PBG 430/PBG 530. **PREREQS:** One year of biology and chemistry.

HORT 431. PLANT GENETICS RECITATION (1). Review and demonstration of plant genetics principles. **CROSSLISTED** as CSS 431 and PBG 431.

HORT 433. SYSTEMATICS AND ADAPTATION OF VEGETABLE CROPS (4). Covers the botanical and taxonomic relationships, breeding systems and adaptation of vegetable crops. Fresh material is used to illustrate varietal differences and traits of importance. Lec/lab. **CROSSLISTED** as CROP 433/CROP 533. **PREREQS:** BI 102 or BI 213 or BI 311 or HORT 430 or CSS 430 or HORT 450 or CSS 450 or PBG 450

HORT 438. EXPLORING WORLD AGRICULTURE (2). Survey of crop and livestock production in a designated section of the world, including history, culture, and political situation. Course is designed to prepare students for a tour of study area. **CROSSLISTED** as ANS 438, AREC

438, CROP 438, CSS 438. Graded P/N. This course is repeatable for a maximum of 8 credits.

HORT 441. PLANT TISSUE CULTURE (4). Principles, methods, and applications of plant tissue culture. Laboratory is important part of course. Topics include callus culture, regeneration, somaclonal variation, micropropagation, anther culture, somatic hybridization, and transformation. Lec/lab. **CROSSLISTED** as PBG 441/PBG 541, MCB 541. **PREREQS:** (BI 311 and BOT 331) or HORT 430 or PBG 430

HORT 447. ARBORICULTURE (4). The principles and practices of arboriculture, the art and science of selecting, planting, establishing and maintaining trees in urban, suburban, commercial and residential landscapes. Lec/lab. **CROSSLISTED** as FES 447. Offered via Ecampus only. **PREREQS:** (FOR 141 or FES 141 or FOR 241 or FES 241 or (HORT 226 and HORT 228)) and (FOR 111 or HORT 112)

HORT 450. PLANT BREEDING (4). An introduction to the genetic improvement of self-pollinated, cross-pollinated, and asexually propagated species and the genetic principles on which breeding methods are based. Examples are drawn from a wide range of crops, including cereal grains, grasses, fruits, nuts, and vegetables; guest lecturers discuss their breeding programs. Additional topics include crop evolution, germplasm preservation, disease resistance, and biotechnology. Lec/lab. **CROSSLISTED** as CSS 450/CSS 550, PBG 450/PBG 550. **PREREQS:** BI 311 or (PBG 430 or CSS 430 or HORT 430)

HORT 451. TREE FRUIT PHYSIOLOGY AND CULTURE (4). Plant growth and development in relation to tree fruit production; emphasis on canopy development and pruning theory, flowering and fruit set, and development, dormancy, and cold acclimation. Field trips required. **PREREQS:** HORT 301* and BOT 331*

HORT 452. BERRY AND GRAPE PHYSIOLOGY AND CULTURE (4). Production of wine grapes, caneberries, strawberries, blueberries, and other miscellaneous berry crops. Emphasis on plant growth and development; pruning and training systems; flower and fruit development and cultivars. Field trips required. Offered in alternate years. **PREREQS:** HORT 301

HORT 453. GRAPEVINE GROWTH AND PHYSIOLOGY (3). The physiological aspects of grapevine growth and development including dormancy, flowering and fruit set, vegetative growth, fruit development and water relations. Additional topics include taxonomy, morphology and physiological influences of vineyard mesoclimate and vine microclimate. Lec/lab. **PREREQS:** HORT 301 or instructor approval.

HORT 454. PRINCIPLES AND PRACTICES OF VINEYARD PRODUCTION (3). The relationship of vineyard and canopy management to grapevine physiology and fruit quality. Nutrient/water relations within the soil/vine continuum. Vineyard microclimate, floor management, and pests will also be discussed. Lec/lab. **PREREQS:** HORT 301 and HORT 453 (need not be taken before HORT 454 but is highly recommended).

HORT 455. URBAN FOREST PLANNING, POLICY AND MANAGEMENT (4). Examination of planning, policy, and management strategies used in the stewardship of urban natural resources. Fundamentals for developing effective programs to maximize the economic, environmental, and social values and benefits of urban forest landscapes. **CROSSLISTED** as FES 455. Taught via Ecampus only. **PREREQS:** FES 350 or FOR 350 or HORT 350

HORT 463. SEED BIOLOGY (3). Information about reproductive development of plants such as pollination and fertilization, which is important for the initiation of seed formation, will be provided. Embryo and endosperm development as well as accumulation of seed storage materials, which are major events during seed development, will be

covered, as well as the dormancy and germination mechanisms in mature seeds. Lectures and discussions (presentations required for graduate students). Offered every even year fall term. CROSSLISTED as CROP 463/CROP 563. Lec/lab.

HORT 480. CASE STUDIES IN CROPPING SYSTEMS MANAGEMENT (4). Decision cases involving the production of field and horticultural crops; individual and group activities; discussion of the decision-making process. Multiple field trips required. A field trip fee will be charged. CROSSLISTED as CROP 480/CROP 580 and CSS 480/CSS 580. This course is repeatable for a maximum of 8 credits. **PREREQS:** CROP 300 or CSS 300 or HORT 300 or and senior standing in agriculture.

HORT 481. CASE STUDIES IN HORTICULTURAL SYSTEMS MANAGEMENT (4). Field-based decision cases involving problematical situations encountered in horticultural farming systems including nursery production, orchard and vineyard systems, market gardening, Christmas tree, and row crop production. Required field trips may include weekend trips. This course is repeatable for a maximum of 8 credits. **PREREQS:** (HORT 300 or CSS 300) and HORT 301 and CSS 305

HORT 485. ADVANCED PERMACULTURE DESIGN (3). Course work centers on choice of advanced design project track: broad scale rural farm or ranch, urban neighborhood or community development, educational institution or organization, or commercial property business development. Students conduct in-depth site analysis and draft design document which is reviewed and revised with research-based knowledge to complete design gaps. **PREREQS:** (HORT 285 and HORT 286)

HORT 495. HORTICULTURAL MANAGEMENT PLANS (3). Develop an integrated management plan for a horticultural enterprise. This course is repeatable for a maximum of 6 credits. **PREREQS:** Senior standing.

HORT 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

HORT 499H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

HORT 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

HORT 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

HORT 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

HORT 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

HORT 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

HORT 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

HORT 509. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

HORT 510. INTERNSHIP (1-12). Offered via Ecampus only. This course is repeatable for a maximum of 12 credits.

HORT 511. RESEARCH AND EDUCATIONAL PERSPECTIVES IN HORTICULTURE (2). Introduces beginning graduate students to the faculty in horticulture and provides an in-depth discussion of their research and education programs.

HORT 512. DISCUSSIONS IN PLANT SCIENCE (1). Student presentations dealing with selected topics in the plant sciences and examined in the context of contemporary research. (Students enroll once in each academic year.) This course is repeatable for a maximum of 2 credits.

HORT 514. INFORMATION SYSTEMS IN AGRICULTURE (4). Introduction to precision farming tools (GIS, image processing, GPS, and computer-linked agricultural equipment). Students also complete a class project.

HORT 516. ADVANCED PLANT NUTRITION (4). Factors influencing nutrient absorption and plant composition with an emphasis on plant physiology and soil chemistry. Diagnostic approaches to determining nutritional status are discussed in detail. Current efforts to enhance nutritional efficiency are explained. Offered alternate years. **PREREQS:** BOT 331 and CSS 305

HORT 517. DIAGNOSIS OF NUTRITIONAL DISORDERS (1). Factors influencing the interpretation of soil and plant testing are discussed. Emphasis is placed on horticultural crops. The same information presented in HORT 316 module (b) is available for graduate credit in this course. **PREREQS:** BOT 331 and CSS 305

HORT 518. CURRENT TOPICS IN ENTOMOLOGY (2). This is a core course of the Horticulture graduate program. Provides an advanced understanding of entomology and its relationship to other disciplines through critical analysis of the scientific literature. Students practice synthesizing information and presenting findings to peers. Instructors, topics, and specific learning objectives vary from term to term. CROSSLISTED as ENT 518. This course is repeatable for a maximum of 12 credits.

HORT 519. CURRENT TOPICS IN PLANT BREEDING AND GENETICS (2). Provides an advanced understanding of plant breeding and genetics and their relationship to other disciplines through critical analysis of the scientific literature. Students practice synthesizing information and presenting findings to peers. Instructors, topics, and specific learning objectives vary from term to term. CROSSLISTED as PBG 519. This course is repeatable for a maximum of 12 credits.

HORT 520. CURRENT TOPICS IN HORTICULTURAL RESEARCH (2). This is a core course in the horticulture graduate program. Students gain an advanced understanding of horticulture science and its relationship to other disciplines through critical analysis of the scientific literature. Students practice synthesizing information and presenting findings to their peers. Instructors, topics and specific learning objectives vary from term to term. This course is repeatable for a maximum of 12 credits.

HORT 530. PLANT GENETICS (3). Introduction to the principles of plant genetics with an emphasis on the structure and function of economically important plant genomes. CROSSLISTED as CSS 430/CSS 530 and PBG 430/PBG 530. **PREREQS:** One year of biology and chemistry.

HORT 533. SYSTEMATICS AND ADAPTATION OF VEGETABLE CROPS (4). Covers the botanical and taxonomic relationships, breeding systems and adaptation of vegetable crops. Fresh material is used to illustrate varietal differences and traits of importance. Lec/lab. CROSSLISTED as CROP 433/CROP 533. **PREREQS:** BI 102 or BI 213 or BI 311 or HORT 430 or CSS 430 or HORT 450 or CSS 450

HORT 541. PLANT TISSUE CULTURE (4). Principles, methods, and applications of plant tissue culture. Laboratory is important part of course. Topics include callus culture, regeneration, somaclonal variation, micropropagation, anther culture, somatic hybridization, and transformation. Lec/lab. CROSSLISTED as PBG 441/PBG 541, MCB 541. **PREREQS:** (BI 311 and BOT 331) or HORT 430 or PBG 430

HORT 547. ARBORICULTURE (4). The principles and practices of arboriculture, the art and science of selecting, planting, establishing and maintaining trees in urban, suburban, commercial and residential landscapes. Lec/lab CROSSLISTED as FES 447.

HORT 550. PLANT BREEDING (4). An introduction to the genetic improvement of self-pollinated, cross-pollinated, and asexually propagated species and the genetic principles on which breeding methods are based. Examples are drawn from a wide range of crops, including cereal grains, grasses, fruits, nuts, and vegetables; guest lecturers discuss their breeding programs. Additional topics include crop evolution, germplasm preservation, disease resistance, and biotechnology. Lec/lab. CROSSLISTED as CSS 450/CSS 550, PBG 450/PBG 550. **PREREQS:** BI 311 or CSS 430 or CSS 530 or PBG 430 or PBG 530 or HORT 430 or HORT 530

HORT 552. BERRY AND GRAPE PHYSIOLOGY AND CULTURE (4). Production of wine grapes, caneberries, strawberries, blueberries, and other miscellaneous berry crops. Emphasis on plant growth and development; pruning and training systems; flower and fruit development and cultivars. Field trips required. Offered in alternate years. **PREREQS:** HORT 301

HORT 555. URBAN FOREST PLANNING, POLICY AND MANAGEMENT (4). Examination of planning, policy, and management strategies used in the stewardship of urban natural resources. Fundamentals for developing effective programs to maximize the economic, environmental, and social values and benefits of urban forest landscapes. CROSSLISTED as FES 555. Taught via Ecampus only. **PREREQS:** FOR 350 or FES 350 or HORT 350 for undergraduates.

HORT 563. SEED BIOLOGY (3). Information about reproductive development of plants such as pollination and fertilization, which is important for the initiation of seed formation, will be provided. Embryo and endosperm development as well as accumulation of seed storage materials, which are major events during seed development, will be covered, as well as the dormancy and germination mechanisms in mature seeds. Lectures and discussions (presentations required for graduate students). Offered every even year fall term. CROSSLISTED as CROP 463/CROP 563. Lec/lab.

HORT 580. CASE STUDIES IN CROPPING SYSTEMS MANAGEMENT (4). Decision cases involving the production of field and horticultural crops; individual and group activities; discussion of the decision-making process. Multiple field trips required. A field trip fee will be charged. CROSSLISTED as CROP 480/CROP 580 and CSS 480/CSS 580. **PREREQS:** CROP 300 or CSS 300 or HORT 300 or and senior standing in agriculture.

HORT 591. SELECTED TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

HORT 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

HORT 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

HORT 603. DISSERTATION (1-16). This course is repeatable for a maximum of 999 credits.

HORT 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

HORT 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

HORT 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

HORT 608. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

HORT 691. SELECTED TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

HORT 699. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

■ PLANT BREEDING AND GENETICS COURSES

PBG 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PBG 199H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

PBG 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PBG 299H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

PBG 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PBG 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

PBG 403. THESIS (1-16). This course is repeatable for a maximum of 99 credits.

PBG 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

PBG 405H. READING AND CONFERENCE (1-16). Offered via Ecampus only. This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

PBG 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

PBG 409. TEACHING PRACTICUM (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

PBG 410. INTERNSHIP (3-12). This course is repeatable for a maximum of 12 credits.

PBG 430. PLANT GENETICS (3). Introduction to the principles of plant genetics with an emphasis on the structure and function of economically important plant genomes. **CROSSLISTED** as HORT 430/HORT 530 and CSS 430/530. **PREREQS:** One year of biology and chemistry.

PBG 431. PLANT GENETICS RECITATION (1). Review and demonstration of plant genetics principles. **CROSSLISTED** as HORT 431 and CSS 431.

PBG 441. PLANT TISSUE CULTURE (4). Principles, methods, and applications of plant tissue culture. Laboratory is important part of course. Topics include callus culture, regeneration, somaclonal variation, micropropagation, anther culture, somatic hybridization, and transformation. **Lec/lab. CROSSLISTED** as HORT 441/HORT 541, MCB 541. **PREREQS:** (BI 311 and BOT 331) or HORT 430 or PBG 430 or CSS 430

PBG 450. PLANT BREEDING (4). An introduction to the genetic improvement of self-pollinated, cross-pollinated, and asexually propagated species and the genetic principles on which breeding methods are based. Examples are drawn from a wide range of crops, including cereal grains, grasses, fruits, nuts, and vegetables; guest lecturers discuss their breeding programs. Additional topics include crop evaluation, germplasm preservation, disease resistance, and biotechnology. **CROSSLISTED** as HORT 450/HORT 550, CSS 450/CSS 550. **Lec/lab. PREREQS:** BI 311 or (PBG 430 or CSS 430 or HORT 430)

PBG 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PBG 499H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

PBG 501. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

PBG 503. THESIS (1-16). Graded P/N. This course is repeatable for a maximum of 999 credits.

PBG 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

PBG 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

PBG 507. SEMINAR (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

PBG 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

PBG 509. TEACHING PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

PBG 510. INTERNSHIP (4). This course is repeatable for a maximum of 12 credits.

PBG 513. PLANT GENETIC ENGINEERING (3). Principles, methods, and recent developments in the genetic engineering of higher plants. Offered alternate years. **PREREQS:** (BI 311 and BOT 331) or (CSS 430 or CSS 530) or (HORT 430 or HORT 530) or (PBG 430 or PBG 530)

PBG 519. CURRENT TOPICS IN PLANT BREEDING AND GENETICS (2). Provides an advanced understanding of plant breeding and genetics and their relationship to other disciplines through critical analysis of the scientific literature. Students practice synthesizing information and presenting findings to peers. Instructors, topics, and specific learning objectives vary from term to term. **CROSSLISTED** as HORT 519. This course is repeatable for a maximum of 12 credits.

PBG 530. PLANT GENETICS (3). Introduction to the principles of plant genetics with an emphasis on the structure and function of economically important plant genomes. **CROSSLISTED** as HORT 430/HORT 530 and CSS 430/CSS 530. **PREREQS:** One year of biology and chemistry.

PBG 541. PLANT TISSUE CULTURE (4). Principles, methods, and applications of plant tissue culture. Laboratory is important part of course. Topics include callus culture, regeneration, somaclonal variation, micropropagation, anther culture, somatic hybridization, and transformation. **Lec/lab. CROSSLISTED** as HORT 441/HORT 541, MCB 541. **PREREQS:** (BI 311 and BOT 331) or HORT 430 or PBG 430

PBG 550. PLANT BREEDING (4). An introduction to the genetic improvement of self-pollinated, cross-pollinated, and asexually propagated species and the genetic principles on which breeding methods are based. Example are drawn from a wide range of crops, including cereal grains, grasses, fruits, nuts, and vegetables; guest lecturers discuss their breeding programs. Additional topics include crop evaluation, germplasm preservation, disease resistance, and biotechnology. **CROSSLISTED** as HORT 450/HORT 550, CSS 450/CSS 550. **Lec/lab. PREREQS:** BI 311 or CSS 430 or CSS 530 or PBG 430 or PBG 530 or HORT 430 or HORT 530

PBG 591. SELECTED TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PBG 598. PLANT CHROMOSOME BIOLOGY (3). Exploration of the relationship between chromosome number, structure, and behavior to gene inheritance, organization, and expression. Discussion of chromosome manipulation strategies for genomics research, genetic analysis, and plant breeding. **PREREQS:** 6 credits of genetics or equivalent.

PBG 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PBG 601. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

PBG 603. DISSERTATION (1-16). Graded P/N. This course is repeatable for a maximum of 999 credits.

PBG 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

PBG 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

PBG 620. DNA FINGERPRINTING (1). Principles and methods for producing and analyzing DNA

fingerprints. Offered even years. **CROSSLISTED** as CSS 620 and MCB 620. **PREREQS:** BI 311 or CSS 430 or CSS 530 or PBG 430 or PBG 530 or HORT 430 or HORT 530 or equivalent.

PBG 621. GENETIC MAPPING (1). Principles and methods for constructing genetic maps comprised of molecular and other genetic markers. Offered even years. **CROSSLISTED** as MCB 621 and CSS 621. **PREREQS:** BI 311 or CSS 430 or CSS 530 or PBG 430 or PBG 530 or HORT 430 or HORT 530 or equivalent.

PBG 622. MAPPING QUANTITATIVE TRAIT LOCI (1). Principles and methods for mapping genes underlying phenotypically complex traits. Offered even years. **CROSSLISTED** as MCB 622 and CSS 622. **PREREQS:** CROP 590 or CSS 590 or ST 513 or equivalent.

PBG 650. ADVANCED PLANT BREEDING AND QUANTITATIVE GENETICS (3). Pedigree, bulk, single-seed-descent, doubled haploid, backcross, testcross, mass, and half-sib, S-1-, and S-2- family breeding methods; breeding hybrids and selecting sources of alleles for developing superior hybrids; the nature and consequences of genotype by environment interactions; marker-assisted backcross and inbred line breeding; quantitative trait locus mapping; random linear models; designing and analyzing cultivar, line, and family selection experiments. Offered odd years. **PREREQS:** (CSS 430 or CSS 530 or PBG 430 or PBG 530 or HORT 430 or HORT 530) and (CSS 450 or CSS 550 or PBG 450 or PBG 550 or HORT 450 or HORT 550) and (ST 411 or ST 511) and (ST 412 or ST 512) and (ST 413 or ST 513)

PBG 691. SELECTED TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PBG 699. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

■ SOIL SCIENCE COURSES

SOIL 101. INTRODUCTION TO HORTICULTURE, CROP, SOIL, AND INSECT SCIENCE (1).

Introduces students with interests in horticulture, crop, soil, and insect sciences to educational and professional opportunities in these disciplines. Speakers will discuss opportunities in research and academia as well as in the applied professional job market. Open to all students. **CROSSLISTED** as CROP 101, ENT 101, HORT 101.

SOIL 102. *INTRODUCTION TO ENVIRONMENTAL SCIENCE AND SUSTAINABILITY (4). An introduction to the science behind critical environmental issues and the biological basis of creating and maintaining sustainable ecosystems. Focus on such questions as: how do we decide what to believe about environmental issues? How do we quantify, restore, and value biodiversity? What is valid science in the global warming debate? **Lec/lab. (Bacc Core Course)**

SOIL 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 199H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

SOIL 205. *SOIL SCIENCE (4). Introduction to the chemical, physical and biological nature of soils. Examines the functions of soil as a medium of plant growth, a recycling system for nutrients and wastes, a modifier of atmospheric chemistry, a habitat for soil organisms, a system for water purification, and an engineering medium. Field and laboratory projects provide an understanding of fundamental soil science principles and the impact of human activities on soil quality and sustainability. **Lec/lab. Field trips required. (Bacc Core Course)**

SOIL 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 299H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

SOIL 316. NUTRIENT CYCLING IN AGROECOSYSTEMS (3). Nutrient forms, transformations, and cycling. Diagnosis and correction of nutrient deficiencies, pH and salinity. Impact of nutrient management practices on crop production, soil health, nutrient use efficiency, and environmental quality. Organic and inorganic fertilization. Lec/lab. **PREREQS:** CH 121 and SOIL 205 or (CSS 205 or CSS 305)

SOIL 325. ^AG AND ENVIRONMENTAL PREDICAMENTS: A CASE STUDY APPROACH (3). Evaluation of controversial agricultural and environmental problems. Production of clear oral and written documents describing and analyzing problems and specific courses of action utilizing team-building skills. (Writing Intensive Course) **CROSSLISTED** as CROP 325. **PREREQS:** (CSS 305 or CSS 205 or SOIL 205)

SOIL 335. *INTRODUCTION TO WATER SCIENCE AND POLICY (3). Policy and science of the hydrologic cycle. Emphasis on interaction between water's natural time-space fluctuations and human uses. (Bacc Core Course) **CROSSLISTED** as GEO 335.

SOIL 366. ECOSYSTEMS OF WILDLAND SOILS (3). Focuses on soils that occur in relatively undisturbed ecosystems such as forests and rangelands. Topics covered include properties and processes specific to understanding and managing the soil resource in these areas. An overview of US Soil Taxonomy will also be given. **PREREQS:** (SOIL 205 or CSS 205 or CSS 305) and an understanding and appreciation of environmental chemistry, biology, ecology, and physics is needed for this course.

SOIL 395. *WORLD SOIL RESOURCES (3). The properties, global distribution, and agricultural productivity of major world soil groups are described. Potentials for human-accelerated soil degradation are introduced for each soil group, and reasons for conflicting assessments of degradation are discussed. (Bacc Core Course) **CROSSLISTED** as CSS 395. Offered via Ecampus only. **PREREQS:** CH 121 and /or equivalent.

SOIL 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 403. THESIS (1-16). Independent, original study and preparation of a senior thesis. This course is repeatable for a maximum of 16 credits. **PREREQS:** Senior standing.

SOIL 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Junior standing.

SOIL 405H. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Junior standing and Honors College approval required.

SOIL 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Junior standing.

SOIL 408. WORKSHOP (1-16). Evaluation and judging of soils in Oregon and other states; directed studies of soil morphology, soil survey, soil fertility, soil physics, soil chemistry, soil biology, and soil information systems. This course is repeatable for a maximum of 16 credits.

SOIL 409. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 410. INTERNSHIP (1-6). Professional work experience previously approved and supervised by the department, written report required. This course is repeatable for a maximum of 12 credits. **PREREQS:** Junior standing.

SOIL 435. ENVIRONMENTAL SOIL PHYSICS (3). Covers principles of soil physical properties and processes as they relate to agricultural, hydrological and environmental problems. Lec/lab. Offered odd years. **PREREQS:** (CSS 205 or CSS 305 or SOIL 205) and CH 123 and MTH 241 and PH 201 or equivalent.

SOIL 445. ENVIRONMENTAL SOIL CHEMISTRY (3). Structural chemistry of clay minerals and organic matter, cation and anion exchange, and soil solution equilibria of soils. Ion exchange, mineral-solution equilibria, and adsorption reactions of silicate clays, oxides, and organic matter are emphasized. Covers the sorption behavior of environmental contaminants and the weathering reactions that govern the transport of reactive solutes through soils. Lec/rec. Offered odd years.

SOIL 455. BIOLOGY OF SOIL ECOSYSTEMS (4). A detailed study of the organisms that live in the soil and their activities in the soil ecosystems, soil as a habitat for organisms, taxonomy and biology of soil organisms, fundamentals of nutrient cycles, special topics in soil biology, review basis of soil microbial and ecological principles. Lec/rec/lab. **PREREQS:** (CSS 305 or CSS 205 or SOIL 205). Courses in chemistry, physics, and microbiology are recommended.

SOIL 466. SOIL MORPHOLOGY AND CLASSIFICATION (4). Observation and description of soil properties in the field; writing soil profile descriptions; evaluating criteria that define features used to classify soils; using soil classification keys. Lec/lab. **PREREQS:** (SOIL 205 or CSS 205 or CSS 305)

SOIL 468. SOIL LANDSCAPE ANALYSIS (4). Principles of soil geomorphology, soil stratigraphy, and surficial processes as applied to understanding the soil system and landscape scales. Emphasis on field observations of soils, geomorphic surfaces, and environment. Field project entails design of soil survey map units, field mapping and GIS cartographic techniques. Lec/lab. Offered even years. **PREREQS:** (SOIL 466* or CSS 466*)

SOIL 475. SOIL RESOURCE POTENTIALS (4). Course builds on knowledge from introductory pedology, soil chemistry, soil physics and soil biology to practice the evaluation of nutrient availability and soil moisture storage in the rooting space. Results from the application of pedotransfer functions to observations at the pit wall are translated into quantitative, numerical expressions of soil resource potentials. Lec/lab. **PREREQS:** (SOIL 435 and SOIL 455 and SOIL 466)

SOIL 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Junior standing.

SOIL 499H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Junior standing and Honors College approval required.

SOIL 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 503. THESIS/DISSERTATION (1-16). This course is repeatable for a maximum of 999 credits.

SOIL 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 508. WORKSHOP (1-16). Evaluation and judging of soils in Oregon and other states; directed studies of soil morphology, soil survey, soil fertility, soil physics, soil chemistry, soil biology, and soil information systems. This course is repeatable for a maximum of 16 credits.

SOIL 509. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

SOIL 510. INTERNSHIP (1-6). Professional work experience previously approved and supervised by the department, written report required. This course is repeatable for a maximum of 6 credits.

SOIL 513. PROPERTIES, PROCESSES, AND FUNCTIONS OF SOILS (4). Physical, chemical, biological, and landscape properties; processes of fluid retention and movement, weathering and cation exchange, decomposition and C-N dynamics, erosion and sedimentation; functions of hydrologic regulation, nutrient cycling, environmental protection, ecological habitat. **PREREQS:** CH 223 or CH 233 or CH 233H or equivalent

SOIL 515. SOIL FERTILITY MANAGEMENT (3). Management of plant nutrients in agronomic systems; diagnosis of nutrient availability and prediction of crop response to fertilizers; interactions between nutrient response and chemical, physical and biological properties of soils. **PREREQS:** CSS 315 and courses in statistics, chemistry and plant physiology.

SOIL 523. PRINCIPLES OF STABLE ISOTOPES (3). An introduction to the theory and use of stable isotopes. Applications of stable isotopes to soil science, plant physiology, hydrology, and ecosystem studies. Offered even years.

SOIL 525. MINERAL-ORGANIC MATTER INTERACTIONS (3). Studies the fundamental properties of the mineral-organic interface and the mechanisms of interaction between mineral and organic soil properties. **PREREQS:** CSS 305 or CSS 205 or SOIL 205 or equivalent.

SOIL 535. SOIL PHYSICS (3). Theoretical elements of soil physical properties and processes related to agricultural, hydrological and environmental problems. Requires concurrent weekly laboratory: SOIL 536. Offered even years. **PREREQS:** CSS 305 or CSS 205 or SOIL 205. Recommended are MTH 241 and CH 123 and PH 201 or equivalent. **COREQS:** SOIL 536

SOIL 536. VADOSE ZONE HYDROLOGY LABORATORY (1). Experimental elements of soil physical properties and processes allowing practical experience in the measurement and analysis of soil physical processes related to agricultural, hydrological and environmental problems. Weekly laboratory. Offered even years. **PREREQS:** CH 123 and PH 201 or equivalent.

SOIL 545. ENVIRONMENTAL SOIL CHEMISTRY (3). Structural chemistry of clay minerals and organic matter, cation and anion exchange, and soil solution equilibria of soils. Ion exchange, mineral-solution equilibria, and adsorption reactions of silicate clays, oxides, and organic matter are emphasized. Covers the sorption behavior of environmental contaminants and the weathering reactions that govern the transport of reactive solutes through soils. Lec/rec. Offered odd years.

SOIL 547. NUTRIENT CYCLING (3). Reviews and discusses ecosystem-level biogeochemical concepts for terrestrial and freshwater ecosystems, primarily by reading and discussing classic and current literature to determine the state-of-knowledge and uncertainties associated with it. Topics include root nutrient uptake mechanisms, soil chemical and biochemical transformations in different soil and ecosystems, measuring soil solution and watershed fluxes, soil organic matter formation and structure, the meaning of sustainability, the concept of N saturation in terrestrial ecosystems, and the use of natural abundance and tracer isotopes in ecosystem biogeochemistry. While forest biogeochemical processes will be emphasized, desert, aquatic, wetland, and prairie ecosystems will also be explored. **CROSSLISTED** as BOT 547 and FS 547. **PREREQS:** College-level chemistry and biology and one class in ecology (BI 370 or equivalent) and/or soils (e.g. SOIL 205).

SOIL 555. BIOLOGY OF SOIL ECOSYSTEMS

(4). A detailed study of the organisms that live in the soil and their activities in the soil ecosystems, soil as a habitat for organisms, taxonomy and biology of soil organisms, fundamentals of nutrient cycles, special topics in soil biology, review basis of soil microbial and ecological principles. Lec/rec/lab. **PREREQS:** CSS 305 or CSS 205 or SOIL 205. Courses in chemistry, physics, and microbiology are recommended.

SOIL 566. SOIL MORPHOLOGY AND CLASSIFICATION

(4). Observation and description of soil properties in the field; writing soil profile descriptions; evaluating criteria that define features used to classify soils; using soil classification keys. Lec/lab. **PREREQS:** CSS 305 or CSS 205 or SOIL 205

SOIL 568. SOIL LANDSCAPE ANALYSIS

(4). Principles of soil geomorphology, soil stratigraphy, and surficial processes as applied to understanding the soil system at landscape scales. Emphasis on field observations of soils, geomorphic surfaces, and environment. Field project entails design of soil survey map units, field mapping and GIS cartographic techniques. Lec/lab. Offered odd years. **PREREQS:** (CSS 566* or SOIL 566*)

SOIL 591. SELECTED TOPICS (1-16).

Course content and title will change with each offering. This course is repeatable for a maximum of 16 credits.

SOIL 599. SPECIAL TOPICS (1-16).

This course is repeatable for a maximum of 16 credits.

SOIL 601. RESEARCH (1-16).

Offered via Ecampus only. This course is repeatable for a maximum of 16 credits.

SOIL 603. THESIS/DISSERTATION (1-16).

This course is repeatable for a maximum of 999 credits.

SOIL 605. READING AND CONFERENCE (1-16).

This course is repeatable for a maximum of 16 credits.

SOIL 606. PROJECTS (1-16).

This course is repeatable for a maximum of 16 credits.

SOIL 607. SEMINAR (1-16).

This course is repeatable for a maximum of 16 credits.

SOIL 608. WORKSHOP (1-16).

This course is repeatable for a maximum of 16 credits.

SOIL 635. ADVANCED SOIL PHYSICS (3).

Explores theoretical development of a key topic in soil physics. Topics may include evaporation from porous media, multiphase fluid movement, soil deformation, and soil salinization, with respect to either historical development, present day understanding or future needs of the field. Course structure incorporates lectures and discussion requiring intensive student participation. Offered odd years. **PREREQS:** (CSS 535 or SOIL 535) and a working knowledge of soil physics and a passing grade in a graduate-level soil physics course.

SOIL 645. SOIL MICROBIAL ECOLOGY (3).

An advanced treatment of current topics in soil microbiology, with an emphasis on the ecology of soil microorganisms. Topics include the size, composition, diversity, and activity of soil microbial communities, linkage of microbial community structure to ecosystem functions, and applications of molecular biology to soil microbiology. Offered even years. **PREREQS:** Recommend SOIL 455 or CSS 455 or MB 448.

SOIL 691. SELECTED TOPICS (1-16).

This course is repeatable for a maximum of 16 credits.

SOIL 699. SPECIAL TOPICS (1-16).

This course is repeatable for a maximum of 16 credits.

The College of Business provides nationally recognized research-based education that prepares profession-ready graduates who can excel in an innovative knowledge-based economy. The undergraduate and graduate programs in business and the undergraduate program in accounting are all accredited by the Association to Advance Collegiate Schools of Business.

The School of Design and Human Environment (SDHE) offers nationally recognized academic programs at the undergraduate and graduate level. Students can gain practical experience in their chosen fields through exciting research, internship and/or study abroad opportunities. For specific information about the School of Design and Human Environment, please refer directly to the SDHE section of this catalog or their website: <http://business.oregonstate.edu/sdhe/advising>.

The information below refers only to the undergraduate/graduate business-specific majors offered by the college.

The College of Business offers seven undergraduate degree programs and three graduate degree programs. Curricula lead to bachelor of arts (BA), bachelor of science (BS), master of business administration (MBA), business administration and accountancy (A-MBA), and doctor of philosophy (PhD) in business administration degrees. For advanced degrees see the Graduate School section of this catalog.

Students wanting to earn a bachelor of arts degree in the College of Business will need to:

1. Demonstrate proficiency through the second year of a foreign language (foreign language is defined as completing the 213 level of that language with a C or better or getting a signed letter by the School of Language, Culture, and Society that states they have determined the student has that level of proficiency without needing the course work), and
2. Demonstrate cultural awareness by either:
 1. Completing 6 credits of upper-division course work focusing on the culture of regions that commonly use the foreign language in which the student is proficient, or
 2. Successfully complete a study abroad, global internship, or research experience of at least 10 weeks in a non-English speaking foreign country while enrolled at OSU. This experience must be clearly documented for audit purposes.

The Bachelor of Arts and Bachelor of Science degrees in Business Administration

offer options in General Business (Cascades Campus only), Hospitality Management (Cascades Campus only), International Business, and Entrepreneurship for Business Majors.

Bachelor of Arts and Bachelor of Science degrees are also available in Business Information Systems, Finance, Management, and Marketing. The Accountancy degree is only a Bachelor of Science.

College of Business undergraduate students have the opportunity to participate in student exchange programs around the world.

The College of Business encourages experiential learning through its Arthur Stonehill International Exchange Program, Business Solutions Group, Austin Entrepreneurship Program, Austin Family Business Program, Close to Customer (C2C) Marketing Project, student clubs, and internships.

FACULTY

Accounting:

Professor Graham
Associate Professors Coakley, Frischmann, Kleinsorge, Moore
Assistant Professors Akroyd, Huang, Lin, B. Scott
Senior Instructor Bourne
Instructors L. Brown, Peacock, Perez

BIS:

Associate Professors Coakley, Marshall, Reitsma
Assistant Professor Zhu
Senior Instructor Raja
Instructors Cabak, Miller

Global Business Analysis:

Professors Hsieh, N. King
Associate Professor Wu
Assistant Professors Kim, I. Scott, Lu
Instructors Costa, Hasbrook, Healey, Lawton, Lewis, Lykins, Martin, Micheau, Moran, Olstad, Rose, Smith, Young

Strategy and Entrepreneurship:

Associate Professors Arthurs, D. Neubaum
Assistant Professors Barden, J. Chen, Murnieks, Vestal
Instructors Briggs, Cassidy, Dowling, Higgins, Mentler, S. Neubaum, Noxel, Van Order

Finance:

Professor Brooks
Associate Professors Becker-Blease, Berger, Mathew, Yang
Assistant Professor Chira
Instructors Burgdorfer, Stojcevski, Varadharajan

Management:

Professor Larson
Associate Professors Baldrige, Hacker
Assistant Professors Cho, Klotz, Leavitt, Schilpzand, Swift
Instructors Broome, Cieri, Crangle,

200 Bexell Hall
 Oregon State University
 Corvallis, OR
 97331-2603
 541-737-3716
 Website: <http://business.oregonstate.edu>

ADMINISTRATION

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James Coakley,
 Associate Dean,
 Academic Programs,
 541-737-3716,
jim.coakley@bus.oregonstate.edu

Gonzalez, LeRoux, Martell, McNeely,
Morris

Marketing:

Professor McAlexander
Associate Professor Koenig
Assistant Professors Barnhart, Bee,
Huff, J. King, Puzakova
Instructors Elton, Tull

Undergraduate Majors

Accountancy (BS, CRED, HBS)

Options
Accounting Information Systems
International Business

Apparel Design (BS, CRED, HBS)

Business Administration (BA, BS, CRED, HBA, HBS)

Options
Entrepreneurship for Business Majors
General Business (Cascades Campus only)
*Hospitality Management (Cascades
Campus only)*
International Business

Business Information Systems

(BA, BS, CRED, HBA, HBS)

Option
International Business

Finance (BA, BS, CRED, HBA, HBS)

Option
International Business

Graphic Design (BFA, HBFA)

Innovation Management (BA, BS, HBA, HBS)

Interior Design (BS, CRED, HBS)

Options
Interior Design
Housing Studies

International Studies (BA, HBA)

Management (BA, BS, CRED, HBA, HBS)

Option
International Business

Marketing (BA, BS, CRED, HBA, HBS)

Option
International Business

Merchandising Management

(BS, CRED, HBS)

Sustainability (BS, HBS)

Minors

Business and Entrepreneurship
Merchandising Management

Certificate Program

Postbaccalaureate Certificate in
Accounting

Graduate Majors

Business Administration (MBA)

Graduate Area of Concentration
Clean Technology
Commercialization
Executive Leadership
Global Operations
Marketing

Research Thesis
Wealth Management

Business Administration (PhD)

Graduate Options
Accounting
Innovation/Commercialization

Business Administration and Accountancy (MBAA)

[To be renamed "Accountancy and
Business Administration" pending
approval #85388]

Design and Human Environment (MA, MAIS, MS, PhD)

Graduate Areas of Concentration (MA, MS)

*Cultural/Historic Aspects of the Near
Environment*
Design in the Near Environment
*Human Behavior and the Near
Environment*
Merchandising Management
Textiles

Graduate Areas of Concentration (PhD)

*Cultural/Historic Aspects of the Near
Environment*
Design in the Near Environment
*Human Behavior and the Near
Environment*

Graduate Minors

Business Administration
Design and Human Environment

HIGH SCHOOL PREPARATION

The following high school courses are recommended for students planning to enroll in the College of Business: English, four years; mathematics, four years; history and social studies, three years; foreign language, two years; natural science, two years. In addition, competence in microcomputer word processing, spreadsheet, and database software is recommended.

TRANSFER STUDENTS

Students planning to transfer into the College of Business should do so as early as possible. Those planning to transfer from a community college should consult with an advisor at the community college to determine the most appropriate courses to complete prior to transfer. An advisor in the College of Business should also be contacted for advice.

ADVISING AND EXPERIENTIAL LEARNING

The College of Business has experienced advisors available to assist students in all academic matters, as well as in the areas of career choice, internships, and other experiential learning opportunities. The resources of the **Career Services office** and College of Business Career Success Center (Bexell 209) are available to

all students seeking information concerning career development and interviews with visiting firms.

CONCURRENT DEGREES

Students who wish to earn an undergraduate degree from the College of Business combined with another OSU degree may enroll in a concurrent degree program. Some degrees must be completed in conjunction with a primary degree (see the International Studies major in International Programs, the Sustainability major in the Department of Forest Ecosystems and Society, or the Education major in the College of Education for more information.) The requirements for earning two degrees are listed under Earning a Degree at OSU. Students who intend to obtain one of their degrees from the College of Business should see an advisor in the College of Business as soon as possible.

MINOR PROGRAMS

The College of Business offers one transcript-visible minor for students majoring in other disciplines. The Business and Entrepreneurship minor allows students to enhance their skills in areas such as marketing, management, finance, and entrepreneurship. More information may be obtained from the College of Business Advising Office, 214 Bexell Hall, 541-737-3716.

THE ARTHUR STONEHILL INTERNATIONAL BUSINESS EXCHANGE PROGRAM

The College of Business administers the largest international business exchange program in the state. This opportunity allows qualified students to study abroad in one of 12 carefully selected and approved programs. Successful completion of course work enables students to earn their option in International Business through this one term of study. Current programs are available in Austria, Australia (I.B. option not available here), Czech Republic, Denmark, Germany, Hong Kong, Netherlands, Norway, Singapore, Spain, Sweden and Thailand. A one-credit orientation class is required the term prior to departure, and a reflection paper is due upon return. All courses are taught in English and focus on various aspects of international finance, management and marketing.

AUSTIN ENTREPRENEURSHIP PROGRAM

Sandy Neubaum, Director

The Austin Entrepreneurship Program (AEP) at Weatherford Hall is dedicated to teaching entrepreneurship and developing entrepreneurial thinking. By combining a formal entrepreneurship curriculum with a broad range of informal curricu-

lum activities in a unique residential college facility, students live, study, work and dream together...sharing ideas, thinking creatively and learning practical life skills through hands-on experience.

AUSTIN FAMILY BUSINESS PROGRAM

Sherri Noxel, *Director*

Located within the College of Business since 1985, the Austin Family Business Program fosters family businesses through workshops, checklists, videos, academic courses, and Internet resources. The program helps business-owning families manage day-to-day operations and plan for future generations.

BUSINESS SOLUTIONS GROUP

Carrie Hertel, *Interim Director*

The Business Solutions Group (BSG) is an experiential learning program that provides product testing and custom software solutions to various business partners—including Fortune 500 companies, state agencies, and OSU departments. In a real-world environment, students hone technical and business skills including troubleshooting, networking, problem solving, object oriented programming, team work, project management, and customer relations. BSG leverages emerging technologies to solve business problems, preparing students for the business community of tomorrow. Paid student positions include test engineer, developer, analyst, project manager, and administrative assistant. Paid internships for OSU credit are also available.

CLOSE TO THE CUSTOMER PROJECT (C2C)

Linda Lovett, *Director*

The C2C Project delivers market research to entrepreneurship students, as well as external clients, while providing experiential learning for students.

GRADUATE PROGRAM

Master of Business Administration

The MBA program is an accelerated management program with an experiential component and an emphasis on innovation, sustainability, technology and entrepreneurship. The program is designed to provide our graduates with the necessary skills to solve complex business problems and to successfully compete in the business marketplace. Foundation courses include such fundamentals as business law, accounting, finance, and marketing. Advanced courses explore contemporary business topics in depth, with an emphasis on sustainability, technology, entrepreneurship and innovation in the global economy. Course work is completed in tandem with the experiential component of the program, the Integrated Business Project (IBP).

With the IBP, student teams are tasked with creating fact-based, research-driven business plans for the companies of their choice. Whether developing an entrepreneurial venture from scratch or providing an established business with a new direction and growth potential, students become active in their own education. As the cornerstone of the College of Business MBA, the IBP program has a lasting impact, not only on students, but on commerce and industry in Oregon.

The MBA program is an intensive, fast-paced program designed to guide students through a rigorous foundation and core curriculum, while allowing them to pursue their interests and push their boundaries. Throughout, students learn to build teams, integrate disciplines, work under pressure and multitask. In short, the same skills they will rely on when they leave campus.

COLLEGE OF BUSINESS ACADEMIC AND PROFESSIONAL STANDARDS

The standards set forth below apply to all students enrolled in the College of Business (COB) and are in addition to those standards applicable to all students in the university. Students are responsible for satisfying these requirements.

PREREQUISITE GRADE REQUIREMENTS

A grade of C– or better is required for prerequisites for all classes offered by the College of Business. A higher grade is required in some classes as noted in the catalog.

ACADEMIC PROGRESSION STANDARDS

Academic progression standards specify the requirements a student must meet in order to graduate with a degree from the College of Business. OSU has minimum GPA standards. The College of Business (COB) has additional GPA requirements and standards. Students must satisfy both OSU and COB standards to earn their business degree.

The COB Progression Standards require that students:

- Achieve a minimum grade of C– or better in all classes used to complete their business degree program.

- Maintain a minimum 2.5 GPA over all course work completed within their business degree program.
- Complete over fifty percent of the business program and discipline course work at OSU.
- Resolve all incomplete (I) grades in any classes within the business degree program within one year, or prior to graduation, whichever occurs first.
- Make satisfactory progress toward the completion of the business degree program in a timely fashion.

The business degree program includes all COB classes (BA/ACTG) taken for major and elective credit and non-BA classes that are part of the degree requirements (see table below). Any course used to satisfy business degree requirements must be taken using the A–F grade mode. The Satisfactory/Unsatisfactory (S/U) grade basis may not be used. If a course is completed with the S/U grade basis prior to declaring the business degree program, the original earned grade (A–F) will be used to compute progression standard GPAs.

Transfer grades in business degree program classes may be used to satisfy course work requirements but are not used in the overall COB GPA calculation used to determine graduation. They are, however, used in the All Inclusive Business GPA. Thus, if a course is completed at OSU and must be repeated to earn a higher grade, then the course must be repeated at OSU for the grade to be included in the GPA calculation.

Lower-division classes (100–200 level) completed at any accredited college or university with a grade of C– or higher may be used to satisfy pre-business core requirements, but will not be included in the overall COB GPA calculation. These transfer courses will be used in the All Inclusive Business GPA.

Upper-division classes (300-level and above) completed with a grade of C– or higher at school(s) accredited by the Association to Advance Collegiate Schools of Business may be used to satisfy upper-division business core and discipline-specific course work requirements, but will not be included in the overall COB GPA calculation. These transfer courses will be used in the All-Inclusive Business GPA.

Progression Group	BA Classes	Non-BA Class
Pre-Business Core	BA 101, BA 211, BA 213, BA 233, BA 260, BA 276, BA 302	WR 222/323/327, MTH 241, MTH 245, COMM 111 or COMM 114, ECON 201, ECON 202
Upper-Division Business Core	BA 333, BA/FIN 340 or BA 360, BA 347, BA 352, BA 353, BA 357, BA 370 or ACTG 378, BA 376, BA 390, BA 466	
Discipline-Specific Course Work	All BA/ACTG courses completed as part of the business degree	ECON 330, ECON 340 (Finance Discipline)

Guiding Professional Standards for the College of Business Community

As a member of the College of Business community you should strive to:

- treat others with honesty, respect, and courtesy;
- maintain the highest levels of academic integrity;
- act in accordance with ethical and social responsibilities;
- foster a professional learning environment; and
- act in a professional manner.

You are also expected to comply with the law as well as all university regulations and policies that apply to you. Those university policies include, but are not limited to, the University Student Conduct Regulations, the university's Discrimination and Harassment Policies and the university's Policy on Acceptable Use of Computing Resources. Failure to comply with these laws, regulations, and policies may result in the pursuit of disciplinary action by the college, as detailed further below.

General Statement on Professional Conduct and Academic Integrity

The Guiding Professional Standards for the College of Business community, subscribed to by all members of the College of Business community, are intended to support and implement the values held by the college. Those values encompass the pursuit of excellence in teaching, learning and scholarship. All members of the College of Business community accept our responsibility to strive to meet those standards and to act in an ethically proper manner in our dealings with others. We dedicate ourselves to create and nurture a culture of innovation, cooperation, diversity and mutual respect within the College of Business while recognizing and pursuing the social responsibilities imposed by these values.

A reputation for personal integrity is valuable in the business and broader world. A good reputation is created through personal behavior and performance over time that is observed by friends, colleagues, and business associates, both superiors and subordinates.

The students, faculty, administrators and staff of the College of Business are committed to fostering and creating a positive, professional learning environment. These goals will be pursued by conduct that is honest, civil, courteous and responsible.

Academic and Disciplinary Procedures

The College of Business Academic and Disciplinary Procedures govern the college's response to a student's failure to progress adequately academically in the college or a violation of the law or university regulations and policies that apply to the student, including the Guid-

ing Professional Standards of the college, the university Student Conduct Regulations, the university's Discrimination and Harassment Policies, or the university's Policy on Acceptable Use of Computing Resources. As is the case for all students, College of Business students are also subject to the university's Student Conduct Regulations and the procedures for enforcement of those regulations.

A failure by the student to progress adequately academically or a violation by the student of the Guiding Professional Standards of the college, the university Student Conduct Regulations, the university's Policy on Discrimination and Harassment, or the university's Policy on Acceptable Use of Computing Resources may result in the pursuit of one or more of the actions detailed below, including dismissal of the student from the college. The college will notify a student against whom it pursues such action with information about the effect of the action on the student's status in the college and information regarding how the student may respond to or appeal the action.

A student against whom the college pursues such action will be issued one of the following notices, depending on the student's academic status or the severity or frequency of the behavior resulting in the action:

Warning Notice

"Warning" status is cautionary and is issued for one or more of the following academic reasons:

- Earning a 'D' or 'F' grade in a business program class.
- A small deviation below the minimum 2.5 business GPA.
- Failure to complete business course work in a timely fashion.

A "Warning" may also be issued to identify student behavior which may place a student's enrollment status in the college at risk. The warning status may be removed following satisfactory resolution of behavioral concerns, as determined by the college.

Probation Notice

If a student has larger deviations from the COB progression standards than those defined for a warning, or if the student continues to be out of compliance with any of the COB academic progression standards following a Warning, the student may be placed on probation and may be required to take specific action to correct the problem(s).

Student behavior that is a significant departure from the law or university regulations and policies that apply to the student, including the Guiding Professional Standards of the college, the university Student Conduct Regulations, the university's Discrimination and Harassment Policies, or the university's Policy on Acceptable Use of Computing

Resources may also result in "Probation" status. Such behavior includes, but is not limited to, academic dishonesty, criminal violations, repeated or intentional violation of university policies, or significant breaches of the Guiding Professional Standards of the college, the university Student Conduct Regulations, the university's Policy on Discrimination and Harassment or the university's Policy on Acceptable Use of Computing Resources. Detailed information on university policies can be found at the Student Conduct website at <http://oregonstate.edu/studentconduct/home/>.

A student on probation status must follow recommendations of the college in order to avoid suspension or dismissal. Students on probation status must meet with an advisor following each term to review their progress and standing in the college until the probation status is removed. Students who successfully fulfill the recommendations will be removed from probation status. Students who fail to follow or are unsuccessful in fulfilling the recommendations will be placed on suspension and evaluated for dismissal from the college.

Probation may also be continued if a student is still out of compliance with academic or behavioral requirements but is taking steps to correct the problem(s) identified.

Suspension Notice

A student who has displayed severe or repeated departures from the law or university regulations and policies that apply to the student, including the Guiding Professional Standards of the college, the university Student Conduct Regulations, the university's Discrimination and Harassment Policies, or the university's Policy on Acceptable Use of Computing Resources may be placed on suspension status. The college will place an indefinite hold on the progression of a student placed on suspension status until the college can adequately evaluate whether the student will be allowed to continue in the college.

Students engaged in an appeal of their dismissal from the college will also be placed on suspension status.

A student may also be placed on suspension if a student does not take steps to become compliant with the college's academic progression standards (such as retaking a class the student has failed), or the student is not making adequate progress in correcting the student's academic problems.

A student placed on suspension status will not be allowed to progress in the college. The student must wait a minimum of one term before reapplying for admission to the college and must submit applications in accordance with published guidelines and deadlines. Following

reapplication, the college will review the student's record, including any interim proof of progress. After review, the college may recommend immediate dismissal from the college, recommend that the student be continued on suspension status pending receipt of additional information, or prescribe a plan to address specific concerns that resulted in the student's suspension status. If a plan for progression is developed by the college, the student will be placed on probation status pending satisfactory progress.

If the student was placed on suspension for academic reasons and qualifies for readmission, the student must start in Pre-Business and reapply to ProSchool. If, after readmission, the college's or the university's academic standards or requirements have changed since the student was last a business major, the student will be subject to the more recent standards or requirements.

Dismissal from the College

A student will be dismissed from the college if the student's behavior is a sufficiently severe and significant departure from the law or university regulations and policies that apply to the student, including the Guiding Professional Standards of the college, the university Student Conduct Regulations, the university's Discrimination and Harassment Policies, or the university's Policy on Acceptable Use of Computing Resources or the student fails to constructively address previous behavioral concerns after college action. A student may also be dismissed if the student departs significantly from the college's academic progression standards or if the student fails to follow adequately any plan prescribed while the student is on probation status.

Appeal of Academic or Disciplinary Status

1. Any student who wishes to challenge the student's academic or disciplinary status at the college must submit an appeal in writing to the dean of the college within seven (7) calendar days following the issuance of a notice from the college identifying the student's status. The dean may refer the issue back to the college's standing committee for review, if warranted. Following the review, the dean will notify the affected student of his or her decision by mail or email.
2. The student may appeal the dean's decision to the Oregon State University provost in writing within seven (7) calendar days following issuance of a decision by the dean. The provost's decision on the appeal is the university's final decision.

SCHOOL OF DESIGN AND HUMAN ENVIRONMENT

Minjeong Kim, *Associate Dean*
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Oregon State University
Corvallis, OR 97331-5101
541-737-3796
Email: minjeong.kim@oregonstate.edu
Website: <http://business.oregonstate.edu/sdhe>

FACULTY

Professors Burns, Marks
Associate Professors Chen, Kim, Lee, Mullet, Pedersen, Read
Assistant Professor Tural
Senior Instructors Burnett, Egan
Instructors Cluver, Gallagher, Scranton, Vong

Undergraduate Majors

Apparel Design (BS, HBS)
Graphic Design (BFA, HBF)
Interior Design (BS, HBS)

Options

Interior Design
Housing Studies

Merchandising Management (BS, HBS)

Minor

Merchandising Management

Graduate Major

Design and Human Environment (MA, MAIS, MS, PhD)

Graduate Areas of Concentration

Cultural/historic aspects of the near environment, design in the near environment, human behavior in the near environment, merchandising management, and textiles

Graduate Minor

Design and Human Environment

The School of Design and Human Environment offers undergraduate instruction in the areas of apparel design, interiors/residential design, housing studies, graphic design, and merchandising management. Advanced courses prepare students for positions in retailing of apparel and textile products, design and development of sewn products for manufacturers and retailers, housing design and policy, design of commercial and residential environments, graphic design and visual communications, and for graduate work leading to research and college and university teaching.

GRADUATE STUDIES

The school offers the MS, MA, MAIS, and PhD degrees. Areas of emphasis for the MS and MA degrees include cultural/historic aspects of the near environment, human behavior and the near environ-

ment, design in the near environment, merchandising management and textiles. Areas of emphasis for the PhD degree include cultural/historic aspects of the near environment, design in the near environment, and human behavior and the near environment.

PRE-PROFESSIONAL STUDIES ADMISSION REQUIREMENTS

To be considered for admission to the professional majors of Apparel Design, Graphic Design, and Interior Design (Interior Design option and Housing Studies option), a student must earn a minimum GPA and complete a list of designated courses. Application information is available in the College of Business Advising and Services Office in Bexell Hall 214.

APPAREL DESIGN (BS, CRED, HBS)

The apparel design program prepares students to work in the diverse field of design. Apparel design and product development professionals design sportswear, suits, dresses, coats, accessories, and just about everything else that people wear. Designers research color and style trends to create concepts and sketches for fashions one to two years in advance of the market. Some create new garment styles while others adapt styles from a previous season.

The Apparel Design major is a professional program (major code 400). Entering students are designated as Pre-Apparel Design majors (major code 453). After completing at least 40 credits, students apply for acceptance into the professional program. Students will not be permitted to take Apparel Design professional course work without acceptance into the professional program. To be considered for admission into the Professional Apparel Design program, all Pre-Apparel Design students must meet the following requirements:

- Declared as Pre-Apparel Design major prior to applying to the professional program.
- A 2.5 cumulative OSU GPA.
- Completed and received a C– or better in all Pre-Apparel Design Core courses. No more than one of the core courses may be in-progress at the time of application and acceptance; acceptance is provisionally granted based on completion of the course.
- Completed at least 40 credits of course work before the first term of the professional program. (Transfer credits: maximum of 30 credits transferred from accredited institution.)

Baccalaureate Core (48)

Courses may include BCC courses in the pre-professional core and professional core.

Pre-Apparel Design Core

COMM 111. *Public Speaking (3)
 or COMM 114. *Argument and Critical Discourse (3)
 or COMM 218. *Interpersonal Communication (3)
 DHE 160. Design Perspectives (4)
 DHE 161. Design Explorations (4)
 DHE 170. Introduction to the Textile and Apparel Industry (4)
 MTH 111. *College Algebra (4)
 WR 121. *English Composition (3)
 Two terms of Baccalaureate Core Science

Apparel Design Professional Core (117-120)

BA 390. Marketing (4)
 DHE 121. Computer Design for Apparel (3)
 DHE 227. Apparel Construction (3)
 DHE 255. Textiles (5)
 DHE 270. *Appearance, Power and Society (4)
 DHE 277. Fashion Trend Analysis (3)
 DHE 321. Technical Drawing, Illustration and Fashion Design (4)
 DHE 326. Sewn Product Development (5)
 DHE 327. Flat Pattern Design (4)
 DHE 366. Cross Cultural Aspects of the Near Environment (4)
 DHE 370. ^Textile and Apparel Market Analysis (4)
 DHE 400. Field Experience Orientation and Development (1,1)
 and DHE 410. Field Experience (12)
OR +Select 14 credits from other 300/400-level ANTH, ART, BA, COMM, DHE, TA, PSY or SOC courses.
 DHE 427. Draping (4)
 DHE 428. Apparel Production Processes (4)
 DHE 429. Advanced Apparel Design (4)
 DHE 453. Product Quality Assurance (4)
 DHE 461. History of the Near Environment I (4)
 DHE 462. *History of the Near Environment II (4)
 DHE 463. History of Contemporary Fashion (4)
 DHE 475. Global Production and Trade in Textiles and Apparel (4)
 ECON 201. *Introduction to Microeconomics (4)
 ECON 202. *Introduction to Macroeconomics (4)

Select three support courses from the following: (9-10)

ART 101. *Introduction to the Visual Arts (4)
 ART 204. *Introduction to Art History-Western (3)
 or ART 205. *Introduction to Art History-Western (3)
 or ART 206. *Introduction to Art History-Western (3)
 ART 234. Drawing II/Figure (4)
 DHE 328. Computer-aided Pattern Development (3)(Via Ecampus only)
 TA 147. *Introduction to the Theatre (3)
 TA 242. Visual Principles of Theatre (3)
 TA 243. Principles of Costuming for the Stage (3)
 WR 201. *Writing for Media (3)
 WR 327. *Technical Writing (3)
 WR 414. Advertising and Public Relations Writing (4)

Select three business/merchandising courses from the following: (10-12)

BA 215. Fundamentals of Accounting (4)
 BA 230. Business Law I (4)
 BA 260. Introduction to Entrepreneurship (4)
 BA 347. International Business (4)
 BA 351. Managing Organizations (4)
 DHE 271. Introduction to Retail Buying (3)
 DHE 470. Retail Merchandising (4)
 DHE 472. Merchandise Planning and Control (4)
 MRKT 492. Consumer Behavior (4)

Total=180**Footnotes:**

* Course fulfills baccalaureate core requirement
 + Courses cannot be counted twice to fulfill requirements of the major

GRAPHIC DESIGN (BFA, HBFA)

The Bachelor of Fine Arts degree in Graphic Design (GD) is an exciting and rigorous program at OSU. The disciplinary foundations of graphic design are rooted in visual problem solving, design theory and history, as well as professional practices that tie into business and marketing for specific audiences. Examples of the work graphic designers engage in include both printed and electronic media such as the design of:

- branding and visual identities
- publication design (magazines, newspapers, catalogs)
- information design
- package design
- exhibition design
- interactive design (Web, video)

The discipline of graphic design is constantly changing due to new technologies, broader target audiences, and softer boundaries between disciplines. Students learn to be adaptable, flexible and collaborative in how they work. Graphic designers are very creative and often have strengths and interests in drawing, printmaking and photography. Students are encouraged to work both on and off the computer in realizing their final design solutions.

All students entering the BFA degree in Graphic Design must begin as a Pre-Graphic Design major (major code 479). Admission to the Professional Graphic Design major comes at the end of the freshman year, following a year of pre-professional design foundation courses. The program is extremely competitive. There are 25 students chosen each spring for admittance into the professional cohort. It is important to work closely with the SDHE advisor to ensure you are taking the appropriate pre-graphic design courses.

Students must receive a C- or better in courses for the major.

Freshman Year-Foundation Courses

ART 121. Foundations: Computers in Visual Arts (3)

ART 122. Foundations: 4-D (4)
 ART 131. Foundations: Drawing 1 (4)
 DHE 121. Computer Design for Apparel (3)
 DHE 160. Design Perspectives (4)
 DHE 161. Design Explorations (4)
 DHE 162. Design Collaborations (4)

Pre-Professional Portfolio Review

(Admission to Graphic Design program determined end of fall term sophomore year.)

GD 225. Introduction to Graphic Design (4)

Sophomore Year-Professional Graphic Design

ART 204. *Introduction to Art History-Western (3)
 ART 205. *Introduction to Art History-Western (3)
 ART 206. *Introduction to Art History-Western (3)
 ART 261. Photography I (4)
 or ART 263. Digital Photography (4)
 GD 226. Typography: The Letter (4)
 GD 228. Graphic Design Processes (4)

Junior Year

ART 366. History of Art (3)
 ART 367. *History of Design (3)
 GD 325. Graphic Design: Collaborative Processes (4)
 GD 326. Typography: Expressive (4)
 GD 327. Typography: Adv. Structures (4)
 GD 328. New Media (4)
 GD 369. Graphic Design History (3)

Senior Year

GD 412. ^Contemporary Issues in Design (3)
 GD 420. Graphic Design: Pre-Press (4)
 GD 424. Visual Identity Systems (4)
 GD 428. Senior Thesis Project (4)

Electives: Select 2 of the following: (Not all are offered each year.)

GD 419. Portfolio Review (2)
 GD 421. Information and Publication Design (4)
 GD 422. New Media: Interactive (4)
 GD 423. Experimental Typography (4)
 GD 427. Package Design (4)
 GD 429. Graphic Design Studio (4)
 ANTH, ART, BA, CS, DHE, GD, MGMT, MRKT, NMC, PHL, PSY, SOC, WR Electives (27-29)
 (At least 12 credits should be upper division.)

Credits needed to graduate with a BFA in Graphic Design = 180**Upper-Division Credits Required: 60****INTERIOR DESIGN (BS, CRED, HBS)**

The Interior Design major prepares students for careers in commercial and residential interior design with an emphasis on space planning, lighting design, interior construction and documentation planning, business planning, and textile specification.

The Interior Design major is a professional program. Entering students are designated as pre-professional majors. After completing at least 40 credits, students apply for acceptance into the professional program.

New applicants are not being accepted into the Housing Studies option.

Baccalaureate Core (48)

Courses may include BCC courses in the pre-professional core, professional core, support courses, and emphasis area courses.

Pre-Interior Design Core (32)

BI 101. *General Biology (4)
or BI 102. *General Biology (4)
or BI 103. *General Biology (4)
COMM 111. *Public Speaking (3)
or COMM 114. *Argument and Critical Discourse (3)
or COMM 218. *Interpersonal Communication (3)
DHE 160. Design Perspectives (4)
DHE 161. Design Explorations (4)
DHE 180. Introduction to Single Family Housing (3)
DHE 187. Introduction to Design Communication (3)
MTH 111. *College Algebra (4)
PH 106. *Perspectives in Physics (4)
WR 121. *English Composition (3)

A minimum of 40 credits of course work must be completed prior to the first term of the professional program. (Transfer credits: A maximum of 30 credits transferred from an accredited institution).

Required Professional Core (64)

DHE 182. Computer Assisted Design and Drafting (3)
DHE 255. Textiles (5)
DHE 283. Building Construction and Materials (3)
DHE 287. Studio I: Design Communication (4)
DHE 288. Environmental Building Systems (3)
DHE 289. Studio II: Residential Space Planning (4)
DHE 352. Textiles for Interiors (4)
DHE 387. Studio III: Advanced Design Communication (4)
DHE 389. Studio IV: Kitchen and Bath Design (4)
DHE 443. Studio VI: Commercial Design (4)
DHE 445. Studio VII: Advanced Commercial Design (4)
DHE 461. History of the Near Environment I (4)
DHE 462. *History of the Near Environment II (4)
DHE 464. Contemporary History of Interiors and Housing (3)
DHE 481. ^Professional Practice in Housing and Interior Design (3)
ECON 201. *Introduction to Microeconomics (4)
ST 201. Principles of Statistics (4)

Support Courses (18)

ART204. *Introduction to Art History - Western (3)
BA 230. Business Law I (4)
BA 351. Managing Organizations (4)
DHE 270. *Appearance, Power and Society (4)
HDFS 201. *Contemporary Families in the U.S. (3)

Interior Design Electives (14–16)

DHE 400. Field Experience Orientation and Development (1, 1)
DHE 410. Field Experience (12)
Or completion of the following courses:
ART 205. *Introduction to Art History - Western (3)
ART 206. *Introduction to Art History - Western (3)
ART 367. *History of Design (3)
DHE 366. Cross Cultural Aspects of the Near Environment (4)
DHE/WSE 415. Renewable Materials in the Modern Age (3)

Total=180

HOUSING STUDIES OPTION

The Housing Studies option offers students the opportunity to focus on residential design, universal design, and housing policy and real estate.

Required (24–32)

BA 351. Managing Organizations (4)
DHE 331. Contemporary Issues in Housing (3)
DHE 400. Field Experience Orientation and Development (1,1)
and DHE 410. Field Experience (12)
or select 6 upper-division credits that align with your career goals; school approval required.
DHE 432. Studio V: Advanced Housing Studio (4)
DHE 434. Housing the Aging Population (3)
DHE 435. Housing Policy (3)
DHE 436. Real Estate Finance and Management (5)
H 495. Design for Environment, Safety and Health (3)
or 3 upper-division credits that align with career goals. School approval required.

Total=24–32

INTERIOR DESIGN OPTION

The Interior Design option offers students the opportunity to focus on commercial design with an emphasis on space planning, heating and lighting plans, and interior construction specifications.

After completing at least 45 credits, students apply for acceptance into the professional program and the Interior Design option. New applicants are not being accepted into the Housing Studies options.

Required (46–48)

ART 204. *Introduction to Art History - Western (3)
BA 230. Business Law I (4)
BA 351. Managing Organizations (4)
DHE 255. Textiles (5)
DHE 352. Textiles for Interiors (4)
DHE 443. Studio VI: Commercial Design (4)
DHE 445. Studio VII: Advanced Commercial Design (4)

Select a minimum of 12 credits from the following:

ART 205. *Introduction to Art History - Western (3)

ART 206. *Introduction to Art History - Western (3)
ART 367. *History of Design (3)
DHE 331. Contemporary Issues in Housing (3)
DHE 366. Cross Cultural Aspects of the Near Environment (4)
DHE 400. Field Experience Orientation and Development (1,1)
DHE 410. Field Experience (12)
DHE 432. Advanced Housing Studio (4)
DHE 434. Housing the Aging Population (3)
DHE 435. Housing Policy (3)
DHE 436. Real Estate Finance and Management (5)
ODH1 488. Overseas Studies: Art and Architecture Study Tour (1–6)

Total=46–48

MERCHANDISING MANAGEMENT (BS, CRED, HBS)

Students in the Merchandising Management program prepare for positions in management, merchandising, inventory control, sales promotion, public relations, or human resources. This field offers a wide variety of career opportunities with retailers, manufacturers, marketing research firms and product information services. In a global, diverse, and fast-paced, competitive environment, merchandisers are involved in market analysis, product planning, sourcing, procurement, pricing, distribution and visual presentation of apparel and textile products to satisfy consumer needs.

The Merchandising Management major is a professional program (major code 416). Entering students are designated as Pre-Merchandising Management majors (major code 277). After completing at least 40 credits, students apply for acceptance into the professional program. Students will not be permitted to take Merchandise Management professional course work without acceptance into the professional program. To be considered for admission into the Professional Merchandising Management program, all Pre-Merchandising Management students must meet the following requirements:

- Declared as Pre-Merchandising Management prior to applying to the professional program.
- A 2.5 cumulative OSU GPA.
- Completed and received a C– or better in all Pre-Merchandising Management Core courses. No more than one of the core courses may be in-progress at the time of application and acceptance; acceptance is provisionally granted based on completion of the course.
- Completed at least 40 credits of course work before the first term of the professional program. (Transfer credits: maximum of 30 credits transferred from accredited institution.)

Baccalaureate Core (48)

Courses may include BCC courses in the pre-professional core, professional core, support courses, and emphasis area courses.

Pre-Merchandising Management Core

COMM 111. *Public Speaking (3)
or COMM 114. *Argument and Critical Discourse (3)
or COMM 218. *Interpersonal Communication (3)
DHE 160. Design Perspectives (4)
DHE 161. Design Explorations (4)
DHE 170. Introduction to the Textile and Apparel Industry (4)
MTH 111. *College Algebra (4)
WR 121. *English Composition (3)
Two terms of Baccalaureate Core Science

Merchandising Management Professional Core (62)

DHE 255. Textiles (5)
DHE 270. *Appearance, Power and Society (4)
DHE 271. Introduction to Retail Buying (3)
DHE 277. Fashion Trend Analysis (3)
DHE 326. Sewn Product Development (5)
DHE 370. ^Textile and Apparel Market Analysis (4)
DHE 400. Field Experience Orientation and Development (1,1)
and DHE 410. Field Experience (Sect. 1, Merchandising Management) (12)
OR: Select 14 credits from other 300/400-level ANTH, ART, BA, COMM, DHE, PSY, or SOC courses.
DHE 453. Product Quality Assurance (4)
DHE 461. History of the Near Environment I (4)
or DHE 462. *History of the Near Environment II (4)
DHE 463. History of Contemporary Fashion (4)
DHE 470. Retail Merchandising (4)
DHE 472. Merchandise Planning and Control (4)
DHE 475. Global Production and Trade in Textiles and Apparel (4)

Support Courses (45–48)

AG 111. Computer Applications in Agriculture (3)
or CS 101. Computers: Applications and Implications (4)
BA 215. Fundamentals of Accounting (4)
BA 390. Marketing (4)
ECON 201. *Introduction to Microeconomics (4)
ECON 202. *Introduction to Macroeconomics (4)
ST 201. Principles of Statistics (4)
or MTH 245. *Mathematics for Management, Life, and Social Sciences (4)
and BA 276. Introduction to Statistical Inference (2)

Select one course from the following:

PHL 205. *Ethics (4)
or PHL 280. *Ethics of Diversity (4)

Select one course from the following:

PHL 121. *Reasoning and Writing (3)
WR 201. *Writing for Media (3)
WR 214. *Writing in Business (3)
WR 222. *English Composition (3)

WR 323. *English Composition (3)
WR 327. *Technical Writing (3)
WR 330. *Understanding Grammar (3)
or HC 199. *Honors Writing (3)

Select one course from the following:

PSY 201. *General Psychology (3)
PSY 202. *General Psychology (3)
SOC 204. *Introduction to Sociology (3)

Select three courses from the following:

BA 260. Introduction to Entrepreneurship (4)
BA 347. International Business (4)
BA 351. Managing Organizations (4)
MGMT 452. Leadership (4)
MGMT 453. Human Resources Management (4)
MRKT 396. Fundamentals of Marketing Research (4)
MRKT 492. Consumer Behavior (4)
MRKT 493. Advertising Management (4)
MRKT 495. Retail Management (4)

Emphasis Areas (12–16)**Select four or more courses (a minimum of 12 credits) from the following.**

At least two must be DHE courses. Categories are provided for advising guidance only.

Design and Merchandising

ART 367. *History of Design (3)
DHE 121. Computer Design for Apparel (3)
DHE 182. Computer Assisted Design and Drafting (3)
DHE 187. Introduction to Design Communication (3)
DHE 352. Textiles for Interiors (4)
DHE 366. Cross Cultural Aspects of the Near Environment (4)
+DHE 461. History of the Near Environment I (4)
or +DHE 462. *History of the Near Environment II (4)
DHE 464. Contemporary History of Interiors and Housing (3)
DHE 577. Fashion Theory (4)

Social and Corporate Responsibility

BA 362. Social Entrepreneurship and Social Initiatives (4)
PHL 440. Environmental Ethics (3)
SOC 466. International Development: Gender Issues (4)
SOC 480. *Environmental Sociology (4)
SOC 481. *Society and Natural Resources (4)

Journalism and Media

+ MRKT 493. Advertising Management (4)
NMC 101. Introduction to New Media Communications (3)
NMC 302. Reporting (3)
NMC 305. Copyediting (3)
NMC 421. *Diffusion of Innovations (3)
+ WR 201. *Writing for Media (3)
+ WR 214. *Writing in Business (3)
WR 414. Advertising and Public Relations Writing (4)
WR 448. Magazine Article Writing (4)

Market Analysis and Research

For those interested in careers in marketing research or graduate school.
DHE 566. Research in the Cross Cultural Aspects of the Near Environment (3)
+MRKT 396. Fundamentals of Marketing Research (4)

MRKT 496 Marketing Research Practicum (4)
PSY 360. Social Psychology (4)
SOC 418. Qualitative Research Methods (4)
ST 351. Introduction to Statistical Methods (4)
ST 352. Introduction to Statistical Methods (4)

Total=180**Footnotes:**

+ Courses cannot be counted twice to fulfill requirements of the major.
* Baccalaureate Core Course
^ Writing Intensive Course (WIC)

MERCHANDISING MANAGEMENT MINOR

The Merchandising Management minor emphasizes the merchandising of textile products such as apparel, outdoor gear, and home furnishings.

BA 215 or equivalent, BA 390, and ECON 201, ECON 202 are prerequisites for upper-division courses in the minor.

Core courses (28)

All courses must be taken on a graded (A–F) basis.

DHE 255. Textiles (5)
DHE 255. Textiles (5)
DHE 270. *Appearance, Power and Society (DPD) (4)
DHE 271. Introduction to Retail Buying (3)
DHE 277. Fashion Trend Analysis (3)
DHE 326. Sewn Product Development (5)
DHE 370. ^Textile and Apparel Market Analysis (4)
DHE 470. Retail Merchandising (4)

Select a minimum of 8 credits from the following:

DHE 366. Cross Cultural Aspects of the Near Environment (4)
DHE 461. History of the Near Environment (4)
DHE 462. *History of the Near Environment II (STS) (4)
DHE 463. History of Contemporary Fashion (4)
DHE 472. Merchandise Planning and Control (4)
DHE 473. Assortment Analysis and Management (4)
DHE 475. Global Production and Trade in Textiles and Apparel (4)

Total=36**DESIGN AND HUMAN ENVIRONMENT (MA, MS, PhD)****Graduate Areas of Concentration**

Cultural/historic aspects of the near environment, design in the near environment, human behavior in the near environment, merchandising management, and textiles

The School of Design and Human Environment offers graduate work leading toward Master of Science, Master of Arts, and Doctor of Philosophy degrees in Design and Human Environment.

Areas of concentration for MS and MA degrees include human behavior in the near environment, cultural and historic

aspects of the near environment, design in the near environment, merchandising management, and textiles.

Areas of concentration for the PhD degree include cultural/historic aspects of the near environment, design in the near environment, human behavior in the near environment, merchandising management, and textiles.

Graduate programs in DHE prepare students for college and university teaching, research and creative scholarship; careers in design, product development, product quality assurance or merchandising; historic/cultural research, collection management, and preservation of textile and architectural artifacts; and public policy.

Research is a central component of the DHE graduate program. Students have an opportunity to work on research and creative scholarships with internationally recognized faculty members who have published in the areas of historic costume, human behavior and the near environment, apparel design, interior design, fashion theory, consumer behavior, and housing.

Students who apply for admission to the program must submit GRE scores, a one-page statement of professional goals including a time schedule for completion of the degree as well as the program and area of concentration they wish to pursue, and three letters of reference. Students are encouraged to begin graduate study fall term. Completion of the degree in summers only is not possible because of course offerings.

For further information, contact Laura Scott, laura.scott@bus.oregonstate.edu, School of Design and Human Environment, Oregon State University, Corvallis, OR 97331-5101

DESIGN AND HUMAN ENVIRONMENT GRADUATE MINOR

For more details, see the school advisor.

■ DESIGN AND HUMAN ENVIRONMENT COURSES

DHE 121. COMPUTER DESIGN FOR APPAREL (3). Instruction in drawing, editing, and layout techniques using Adobe Illustrator and Photoshop. Studio.

DHE 160. DESIGN PERSPECTIVES (4). Overview of how design reflects and shapes social, cultural, and temporal values and contexts across many different areas of design specialization. Areas to be explored include design processes, principles, and problem solving.

DHE 161. DESIGN EXPLORATIONS (4). Introduction to principles and theories of design through interactive development and making of project work. Topics include basic design terminology, design principles, and materiality. Lec/studio. **PREREQS:** DHE 160

DHE 162. DESIGN COLLABORATIONS (4). Basic principles of collaborative teamwork within a design context. Team-oriented design project is the focus of this course. **PREREQS:** DHE 161

DHE 170. INTRODUCTION TO THE TEXTILE AND APPAREL INDUSTRY (4). Overview of industry sectors involved in the planning, creation, production, merchandising, distribution, and consumption of textile, apparel, and related products. Overview of various career options within the industry.

DHE 180. INTRODUCTION TO SINGLE FAMILY HOUSING (3). Critical examination of single family housing. Considers space planning fundamentals. Introduces construction principles and methods. Develops a working knowledge of methods used to communicate architectural ideas.

DHE 182. COMPUTER ASSISTED DESIGN AND DRAFTING (3). Instruction in computer assisted design and drafting techniques. **PREREQS:** Enrollment restricted to pre-interiors, pre-housing, and merchandising management majors.

DHE 187. INTRODUCTION TO DESIGN COMMUNICATION (1-3). Fundamentals of design communication including drafting, lettering, illustrative sketching, perspective, and orthographic projections. Lec/studio. **PREREQS:** DHE 180 and enrollment restricted to pre-interiors, pre-housing, and merchandising management majors.

DHE 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

DHE 227. APPAREL CONSTRUCTION (3). Construction techniques and processes used to produce apparel. Analysis of apparel construction related to equipment, cost, quality, end use and customer needs.

DHE 240. SURVEY OF DESIGN IN THE NEAR ENVIRONMENT (3). Introduction to theories of aesthetics and elements and principles of design as related to the fields of apparel, interiors, housing, and merchandising.

DHE 245. APPLICATIONS OF DESIGN THEORY (5). Examines theories of design and aesthetics, application of the elements and principles of design related to apparel, housing, and interior design. Lec/studio. **PREREQS:** Enrollment restricted to pre-interiors, pre-housing and pre-apparel majors.

DHE 255. TEXTILES (5). Properties, identification, selection, use and care of textile fibers and fabrics. Analysis of fiber, yarn, fabric construction, color and finish in textiles. Lec/lab. **PREREQS:** Enrollment restricted to apparel design, merchandising management, pre-interiors, and interior design majors and minors.

DHE 270. *APPEARANCE, POWER AND SOCIETY (4). Survey of the cultural, sociological, psychological, economic, and aesthetic influences on appearance and power. (Bacc Core Course)

DHE 271. INTRODUCTION TO RETAIL BUYING (3). Introduction to soft goods retailing with a focus on the role of the retail buyer. Fundamental retailing and merchandising concepts, sustainable and socially responsible decision-making related to retail buying, basic merchandising mathematics, and Excel skill development. Lec/lab.

DHE 277. FASHION TREND ANALYSIS (3). The fashion trend forecasting process within the soft goods industry; use of information sources and trend analysis in developing and promoting a fashion product. **PREREQS:** Enrollment restricted to merchandising management, pre-apparel and apparel design majors.

DHE 283. BUILDING CONSTRUCTION AND MATERIALS (3). Introduction to the manufacture, characteristics and use of construction materials used in contract and residential construction, including environmentally friendly materials. **PREREQS:** Enrollment restricted to students who have been admitted into the DHE interior design professional program.

DHE 287. STUDIO I: DESIGN COMMUNICATION (4). Design communication through electronic media: 2D and 3D visualizations and

presentations of interior space. Lec/studio. **PREREQS:** DHE 187 and enrollment restricted to housing studies and interior design majors.

DHE 288. ENVIRONMENTAL BUILDING SYSTEMS (3). Lighting, heating, ventilating, air conditioning, and acoustical systems in residential and commercial buildings. Includes sustainable building principles. **PREREQS:** (DHE 283 and DHE 287) and enrollment restricted to housing studies and interior design majors.

DHE 289. STUDIO II: RESIDENTIAL SPACE PLANNING (4). Utilization of space planning principles in the design of residences. Includes rendering, perspective drawing, graphic communication techniques, and model building. **PREREQS:** DHE 287 and enrollment restricted to housing studies and interior design majors.

DHE 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

DHE 300. FIELD EXPERIENCE ORIENTATION AND DEVELOPMENT (1-2). Exploration of career choices, goals, and field experience opportunities; preparation in planning, obtaining, and completing an internship. Graded P/N. Section 1: Apparel Design. Section 2: Interior Design and Housing Studies. Section 3: Merchandising Management. Section 4: Graphic Design. This course is repeatable for a maximum of 3 credits.

DHE 321. TECHNICAL DRAWING, ILLUSTRATION AND FASHION DESIGN (4). Techniques in technical drawing and fashion illustration; use of computer-aided design applications in the design of apparel. **PREREQS:** (DHE 245 and DHE 277) and enrollment restricted to apparel design majors.

DHE 326. SEWN PRODUCT DEVELOPMENT (5). Materials, assembly process, quality factors, and costs in the development of sewn textile products; consideration of consumer product expectations and intended end-use. Lec/lab. **PREREQS:** (DHE 250* or DHE 255*) and enrollment restricted to merchandising management, pre-apparel, and apparel design majors.

DHE 327. FLAT PATTERN DESIGN (4). Pattern design using the flat pattern method; manual and computerized pattern drafting, development and construction of design prototypes. **PREREQS:** DHE 321 and enrollment restricted to apparel design majors.

DHE 328. COMPUTER-AIDED PATTERN DEVELOPMENT (3). Computer-aided flat pattern, grading and marker techniques using pattern development software. **PREREQS:** DHE 327 or previous flat pattern experience.

DHE 331. CONTEMPORARY ISSUES IN HOUSING (3). Introduction to housing as a product, environment, service and process. Emphasizes housing issues that have impact upon the well-being of individuals, families and communities.

DHE 352. TEXTILES FOR INTERIORS (4). Types, qualities, and maintenance of functional and decorative fabrics for homes and public buildings. Use of specifications, standards, and legislation. **PREREQS:** DHE 255 and enrollment restricted to merchandising management and interior design majors.

DHE 366. CROSS CULTURAL ASPECTS OF THE NEAR ENVIRONMENT (4). Sociocultural study of the function and design of clothing, housing, interiors, and textiles. Cultural diversity; impact of cross-cultural contact; ethnicity.

DHE 370. ^TEXTILE AND APPAREL MARKET ANALYSIS (4). Organization, operation, and merchandising activities of the domestic textile and apparel industries. Analysis of the marketing process and the product/service mix of textile and apparel manufacturers. (Writing Intensive Course) **PREREQS:** DHE 277* and BA 390 is recommended. Enrollment restricted to merchandising management, pre-apparel, and apparel design majors.

DHE 387. STUDIO III: ADVANCED DESIGN COMMUNICATION (4). Development of illustrative sketching, perspective drawing, concept model construction, and presentation materials.

PREREQS: DHE 289 and enrollment restricted to housing studies and interior design majors.

DHE 389. STUDIO IV: KITCHEN AND BATH DESIGN (4). Kitchen and bath planning in compliance with building codes and industry standards, with emphasis on resource conservation, safety, and special needs. This course utilizes both CAD and hand drafting.

PREREQS: DHE 387 and enrollment restricted to housing studies and interior design majors.

DHE 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

DHE 400. FIELD EXPERIENCE ORIENTATION AND DEVELOPMENT (1). Exploration of career choices, goals, and field experience opportunities; preparation in planning, obtaining, and completing an internship. Graded P/N. Section 1: Apparel Design. Section 2: Interior Design and Housing Studies. Section 3: Merchandising Management. This course is repeatable for a maximum of 3 credits.

DHE 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

DHE 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

DHE 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

DHE 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

DHE 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

DHE 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

DHE 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

DHE 409. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

DHE 410. FIELD EXPERIENCE (6-12). Integration and application of academic preparation in an on-the-job work situation with supervision by personnel at the participating site and university faculty. Application must be made prior to participation. Section 1: Merchandising Management (12). Section 2: Interior Design (12). Section 3: Apparel Design (12). This course is repeatable for a maximum of 16 credits. **PREREQS:** DHE 400 and junior standing and departmental approval. Sect. 1: BA 215 and DHE 370. Sect. 2: DHE 289. Sect. 3: DHE 321.

DHE 415. RENEWABLE MATERIALS IN THE MODERN AGE (3). Micro-renewable materials anatomy course taught within an interdisciplinary, hands-on format. Suitable for all majors and backgrounds. Course covers the micro- and macro-anatomy of wood and other common renewable materials like bamboo and cellulose fibers. Utilizes studio-based learning. **CROSSLISTED** as WSE 415.

DHE 422. DHE FASHION SHOW AND DESIGN EXHIBITION (1-16). Special topics in design and human environment. This course is repeatable for a maximum of 16 credits.

DHE 427. DRAPING (4). Garment design based on manipulation of fabric on a body form; emphasis on the interrelationships between fabric, garment design, and the human form. **PREREQS:** (DHE 321 and DHE 327) and enrollment restricted to apparel design majors.

DHE 428. APPAREL PRODUCTION PROCESSES (4). Production pattern-making, pattern grading, marker making, garment specifications, and cost analysis. Apparel assembly processes; analysis of equipment capabilities and production processes. **PREREQS:** DHE 327 and enrollment restricted to apparel design majors.

DHE 429. ADVANCED APPAREL DESIGN (4). Design processes and research methods used to develop apparel designs. Students will identify design problems and implement appropriate methods to develop apparel products. **PREREQS:** (DHE 321* and DHE 327* and DHE 427* and DHE 428*) and enrollment restricted to apparel design majors.

DHE 432. STUDIO V: ADVANCED HOUSING STUDIO (4). Problem-solving and design processes to meet or satisfy actual client needs; projects may range from remodeling to new construction design. Professional portfolio preparation. **PREREQS:** DHE 389 and enrollment restricted to interior design majors.

DHE 434. HOUSING THE AGING POPULATION (3). Shelter alternatives and services that address the housing needs of the aging population. Emphasis on the continuum of care and housing options.

DHE 435. HOUSING POLICY (3). Analysis of local, state, and federal housing and community development policies and programs that address the housing issues and needs of individuals, families, and communities.

DHE 436. REAL ESTATE FINANCE AND MANAGEMENT (5). Examines principles and practices used in the purchase, sale and management of real estate. Considers perspectives of consumers, investors, managers, and lenders.

DHE 443. STUDIO VI: COMMERCIAL DESIGN (4). Commercial design, space planning and specifications for facilities such as retail, hospitality, healthcare, public institutions and offices. **PREREQS:** DHE 389 and enrollment restricted to interior design majors.

DHE 445. STUDIO VII: ADVANCED COMMERCIAL DESIGN (4). Interior design project development with emphasis on design of hospitality environments. Application of knowledge of space planning, building codes, and specifications to projects. Studio work includes concept sketches, schematic drawings, contract documents, sample boards, and models. **PREREQS:** DHE 443 and enrollment restricted to interior design majors.

DHE 453. PRODUCT QUALITY ASSURANCE (4). Analysis and evaluation of textile materials and final products in relation to end use. Performance properties and serviceability testing, product specifications and industrial standards. Lec/lab. **PREREQS:** DHE 255 and DHE 326

DHE 461. HISTORY OF THE NEAR ENVIRONMENT I (4). History of clothing, furniture, interiors, textiles, and housing and building styles; primarily Euro-American, from the ancient world to the Renaissance. The influence of social and cultural factors upon design of the near environment. Need not be taken in sequence.

DHE 462. *HISTORY OF THE NEAR ENVIRONMENT II (4). History of clothing, furniture, interiors, textiles, and housing and building styles; primarily Euro-American, from the Renaissance to 1899. The influence of social and cultural factors upon design of the near environment. Need not be taken in sequence. (Bacc Core Course)

DHE 463. HISTORY OF CONTEMPORARY FASHION (4). Historic analysis of fashion change in men's and women's apparel from 1890 to the present. The influence of social and cultural factors upon Euro-American fashion. **PREREQS:** DHE 461 or DHE 462 is recommended.

DHE 464. CONTEMPORARY HISTORY OF INTERIORS AND HOUSING (3). History of housing and interior design from the mid-19th century until the present. **PREREQS:** (DHE 461 or DHE 462)

DHE 470. RETAIL MERCHANDISING (4). Organization, operation, and competitive strategies of soft goods retailers. Planning, procurement, pricing, and promotion of merchandise assortments and inventory management. **PREREQS:** DHE 370

DHE 472. MERCHANDISE PLANNING AND CONTROL (4). Quantitative analysis of inventory planning, pricing, and control for the profitable management of soft goods; analysis of management problems using quantitative data and merchandising principles. Lec/rec. **PREREQS:** DHE 271 and DHE 470 and (BA 215 or BA 215H) and enrollment restricted to Apparel Design and Merchandising Management majors.

DHE 473. ASSORTMENT ANALYSIS AND MANAGEMENT (4). Analysis of merchandise management processes. Use of technology, computerized databases, and simulations for assortment planning and management decision-making in manufacturing or retailing. **PREREQS:** DHE 472 and enrollment restricted to apparel design and merchandising management majors.

DHE 475. GLOBAL PRODUCTION AND TRADE IN TEXTILES AND APPAREL (4). Trade theory and the effects of trade policy, cultural values, and economics on the global production, distribution, and consumption of textile products. **PREREQS:** DHE 370 and the recommended prereqs of DHE 366 and ECON 201 and ECON 202.

DHE 481. *PROFESSIONAL PRACTICE IN HOUSING AND INTERIOR DESIGN (3). Ethical, business, and legal aspects of the design profession. Development of written documents, schedules, specifications, and other materials typical of the profession. (Writing Intensive Course) **PREREQS:** DHE 389 and enrollment restricted to housing studies and interior design majors.

DHE 490. STUDY TOUR (1-6). Planned study tour with specific professional focus. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval and advanced registration and deposit. Course prerequisites as appropriate to topic.

DHE 499. SPECIAL TOPICS IN DESIGN AND HUMAN ENVIRONMENT (1-16). This course is repeatable for a maximum of 16 credits.

DHE 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

DHE 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

DHE 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

DHE 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

DHE 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

DHE 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

DHE 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

DHE 509. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

DHE 510. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

DHE 515. RENEWABLE MATERIALS IN THE MODERN AGE (3). Micro-renewable materials anatomy course taught within an interdisciplinary, hands-on format. Suitable for all majors and backgrounds. Course covers the micro- and macro-anatomy of wood and other common renewable materials like bamboo and cellulose fibers. Utilizes studio-based learning. **CROSSLISTED** as WSE 515.

DHE 527. DRAPING (4). Garment design based on manipulation of fabric on a body form; emphasis on the interrelationships between fabric, garment design, and the human form. **PREREQS:** DHE 321 and DHE 327

DHE 528. APPAREL PRODUCTION PROCESSES (4). Production pattern-making, pattern grading, marker making, garment specifications, and cost analysis. Apparel assembly processes; analysis of equipment capabilities and production processes. **PREREQS:** DHE 327

DHE 529. ADVANCED APPAREL DESIGN (4). Design processes and research methods used to develop apparel designs. Students will identify design problems and implement appropriate methods to develop apparel products. Lec/studio. **PREREQS:** DHE 327 and DHE 427 and DHE 428 are recommended and may be taken concurrently.

DHE 532. STUDIO V: ADVANCED HOUSING STUDIO (4). Problem-solving and design processes to meet or satisfy actual client needs; projects may range from remodeling to new construction design. Professional portfolio preparation. **PREREQS:** DHE 389

DHE 534. HOUSING THE AGING POPULATION (3). Shelter alternatives and services that address the housing needs of the aging population. Emphasis on the continuum of care and housing options.

DHE 535. HOUSING POLICY (3). Analysis of local, state, and federal housing and community development policies and programs that address the housing issues and needs of individuals, families, and communities.

DHE 536. REAL ESTATE FINANCE AND MANAGEMENT (5). Examines principles and practices used in the purchase, sale and management of real estate. Considers perspectives of consumers, investors, managers, and lenders.

DHE 543. STUDIO VI: COMMERCIAL DESIGN (4). Commercial design, space planning and specifications for facilities such as retail, hospitality, healthcare, public institutions and offices. Includes preparation of a professional portfolio. **PREREQS:** DHE 389

DHE 545. STUDIO VII: ADVANCED COMMERCIAL DESIGN (4). Interior design project development with emphasis on design of hospitality environments. Application of knowledge of space planning, building codes, and specifications to projects. Studio work includes concept sketches, schematic drawings, contract documents, sample boards, and models. **PREREQS:** DHE 443

DHE 553. PRODUCT QUALITY ASSURANCE (4). Analysis and evaluation of textile materials and final products in relation to end use. Performance properties and serviceability testing, product specifications and industrial standards. Lec/lab. **PREREQS:** DHE 255 and DHE 326

DHE 555. FUNCTIONAL TEXTILES (3). Development of functional textiles, functional textiles principles, production, evolution, and performance. Applications of functional textiles in areas such as sports and recreation, medical, protective gear, transportation, etc.

DHE 561. HISTORY OF THE NEAR ENVIRONMENT I (4). History of clothing, furniture, interiors, textiles, and housing and building styles; primarily Euro-American, from the

ancient world to the Renaissance. The influence of social and cultural factors upon design of the near environment. Need not be taken in sequence.

DHE 562. HISTORY OF THE NEAR ENVIRONMENT II (4). History of clothing, furniture, interiors, textiles, and housing and building styles; primarily Euro-American, from the Renaissance to 1899. The influence of social and cultural factors upon design of the near environment. Need not be taken in sequence.

DHE 563. HISTORY OF CONTEMPORARY FASHION (4). Historic analysis of fashion change in men's and women's apparel from 1890 to the present. The influence of social and cultural factors upon Euro-American fashion.

DHE 564. CONTEMPORARY HISTORY OF INTERIORS AND HOUSING (3). History of housing and interior design from the mid-19th century until the present.

DHE 566. RESEARCH IN THE CROSS CULTURAL ASPECTS OF THE NEAR ENVIRONMENT (3). Examines the research methods used to study the cultural aspects of the near environment. Case studies concerning cultural variation in the design and use of fabric, clothing and adornment, housing.

DHE 570. RETAIL MERCHANDISING (4). Organization, operation, and competitive strategies of soft goods retailers. Planning, procurement, pricing, and promotion of merchandise assortments and inventory management.

DHE 572. MERCHANDISE PLANNING AND CONTROL (4). Quantitative analysis of inventory planning, pricing, and control for the profitable management of soft goods; analysis of management problems using quantitative data and merchandising principles. **PREREQS:** DHE 570* and BA 215

DHE 573. ASSORTMENT ANALYSIS AND MANAGEMENT (4). Analysis of merchandise management processes. Use of technology, computerized databases, and simulations for assortment planning and management decision-making in manufacturing or retailing. **PREREQS:** DHE 572

DHE 575. GLOBAL PRODUCTION AND TRADE IN TEXTILES AND APPAREL (4). Trade theory and the effects of trade policy, cultural values, and economics on the global production, distribution, and consumption of textile products.

DHE 577. FASHION THEORY (4). Examination of historical, sociological, psychological, marketing, and economic concepts, theories, and research that contribute to current understanding of the fashion process.

DHE 582. AESTHETIC AND PERCEPTUAL THEORIES OF THE NEAR ENVIRONMENT (2). Aesthetic aspects from the philosophical and theoretical bases formulated in art, art history, and psychology as applied to the near environment.

DHE 585. HUMAN BEHAVIOR AND THE NEAR ENVIRONMENT (3). Application of concepts and theories from cultural anthropology, sociology, psychology, and social psychology to the study of clothing and interiors. The significance of the near environment in the dynamics of social interaction.

DHE 587. TRENDS AND ISSUES IN MERCHANDISING (3). Theoretical approach to the study of merchandising policies and practices. Management issues related to strategic planning, competitive positioning, and operational problems of textile and apparel businesses. This course is repeatable for a maximum of 6 credits.

DHE 588. THEORIES IN HOUSING (3). Basic and applied theories developed and used in the field of housing are analyzed, using a conceptual framework that includes contributions from root disciplines related to housing.

DHE 594. RESEARCH METHODS IN DESIGN AND HUMAN ENVIRONMENT (3). Introduction to theory and research design in Design and Human Environment. Includes sampling, measurement, data collection (both qualitative and quantitative) and data analysis.

DHE 599. SPECIAL TOPICS IN DESIGN AND HUMAN ENVIRONMENT (1-16). This course is repeatable for a maximum of 16 credits.

DHE 601. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

DHE 602. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

DHE 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

DHE 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

DHE 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

DHE 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

DHE 608. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

DHE 609. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

DHE 610. INTERNSHIP/WORK EXPERIENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

DHE 665. HISTORIC/CULTURAL THEORIES & METHODS OF THE NEAR ENVIRONMENT (3). Critical analysis of historical and cultural paradigms, theories, and research methods.

DHE 685. ADVANCED TOPICS IN HUMAN BEHAVIOR AND THE NEAR ENVIRONMENT (3). Critical evaluation of the current literature on human behavior as it relates to aspects of the near environment (clothing, interiors, housing). Latest theoretical developments and research methods. Content varies with each offering. **PREREQS:** DHE 585 or equivalent with a minimum grade of at least C-

DHE 690. THEORY DEVELOPMENT (3). Critical analysis of scientific explanation, research, theory, and paradigms. Focus on theory development, particularly within the area of the near environment.

■ GRAPHIC DESIGN COURSES

GD 126. GRAPHIC DESIGN PRO APPLICATION (1). Required pre-graphic design course. Course will focus on the development of a final portfolio to be reviewed by the graphic design faculty at the end of the spring term. **PREREQS:** GD 160 and GD 161 and ART 120 and ART 122 and ART 131 and DHE 121

GD 226. TYPOGRAPHY: THE LETTER (4). An introductory course in the study of the letterform, focusing on the exploration of formal and conceptual relationships. **PREREQS:** (GD 225 or ART 225) and acceptance into BFA in Graphic Design program.

GD 228. GRAPHIC DESIGN PROCESSES (4). An introductory overview of the pertinent theory, history, and application of graphic design processes with an emphasis on conceptualization and visual diagramming. **PREREQS:** (GD 225 or ART 225) and acceptance into the BFA in Graphic Design program.

GD 325. GRAPHIC DESIGN: COLLABORATIVE PROCESSES (4). Intermediate course in graphic design. Emphasis on collaborative projects

exploring principles of group problem solving in typography. **PREREQS:** sophomore block in graphic design.

GD 326. TYPOGRAPHY: EXPRESSIVE (4). An intermediate course encouraging investigation and interpretation in the expressive possibilities of typography, focusing on processes and emotive results. Lec/studio. **PREREQS:** ((GD 225 or ART 225) and (GD 228 or ART 228)) and must be accepted into the graphic design program.

GD 327. TYPOGRAPHY: ADVANCED STRUCTURES (4). An intermediate course investigating the design of organizational typographic structures; presenting complex information in a clear and engaging manner serving utility and beauty. **PREREQS:** sophomore block in graphic design.

GD 328. NEW MEDIA (4). An intermediate course designing digital informational systems; focusing on conceptualization, diagramming, motion, and user-interaction. **PREREQS:** sophomore block in graphic design.

GD 369. GRAPHIC DESIGN HISTORY (3). An intermediate lecture course providing a historical and theoretical overview of the evolution and innovation in graphic design. **PREREQS:** ART 204 and ART 205 and ART 206 and ART 367

GD 412. ^CONTEMPORARY ISSUES IN DESIGN (3). How contemporary culture shapes the practice of graphic design and how design shapes the culture in which we live. Issues examined through lectures, readings, discussion and writing. (Writing Intensive Course)

GD 419. PORTFOLIO REVIEW (2). A course to advise students during their final portfolio preparation. The objective is to complete the portfolio and hone presentation skills and techniques. Graded P/N. **PREREQS:** junior block in graphic design.

GD 420. GRAPHIC DESIGN: PRE-PRESS (4). The fundamentals of graphic design production, including printing paper specification. **PREREQS:** junior block in graphic design.

GD 421. INFORMATION AND PUBLICATION DESIGN (4). Theoretical and historical issues of organizing and visualizing statistics, numbers, and/or complex relationships. Emphasis on conceptualization, visual diagramming, and analysis of subtle visual relationships. **PREREQS:** junior block in graphic design.

GD 422. NEW MEDIA: INTERACTIVE (4). An advanced course designing digital experiences with emphasis on innovative navigation, architectural structures, theoretical, and historical issues of new media. **PREREQS:** Junior block in graphic design and CS 295.

GD 423. EXPERIMENTAL TYPOGRAPHY (4). An advanced course in experimental typography focusing on intent, meaning, and method. **PREREQS:** junior block in graphic design.

GD 424. VISUAL IDENTITY SYSTEMS (4). Theoretical and studio investigation of the visual and conceptual factors that play a role in the creation and communication of identity. This course is repeatable for a maximum of 12 credits. **PREREQS:** junior block in graphic design.

GD 425. ENVIRONMENTAL AND EXHIBITION DESIGN (4). An advanced studio course investigating the design and presentation of information in large-scale and multidimensional formats. **PREREQS:** junior block in graphic design.

GD 427. PACKAGE DESIGN (4). Theoretical and studio investigation of three-dimensional structural and conceptual principles as they relate to the areas of packaging and point-of-purchase display. **PREREQS:** junior block in graphic design.

GD 428. SENIOR THESIS PROJECT (4). An advanced studio course designed to provide the self-directed student with the opportunity to work on a personal, faculty-approved project in graphic

design. **PREREQS:** junior block in graphic design.

GD 429. GRAPHIC DESIGN STUDIO (4). Provides opportunity for students to work with clients on actual projects in a professional environment. Lec/lab. This course is repeatable for a maximum of 16 credits. **PREREQS:** junior block in graphic design. Admission through portfolio review.

COLLEGE OF BUSINESS PROGRAMS

ACCOUNTANCY (BS, CRED, HBS)

Also available at the OSU-Cascades campus.

The Accountancy major at Oregon State University provides a professionally oriented program to prepare students for successful careers in the major fields of accounting. Accounting students take the seven required courses shown below (beyond the introductory accounting courses that are taken by all business students) plus at least two elective courses from the five elective courses shown below. Accounting students satisfy University Baccalaureate Core course requirements and College of Business core course requirements. In addition to the courses, accounting program students must meet all university and college progression standards as well as a minimum of 60 credits in upper-division courses (300–400 level) and a minimum of 180 credits total to graduate. The Oregon State Board of Accountancy requires a minimum of 225 credits in order to take the Uniform Certified Public Accounting Exam.

Accountancy major requirements are divided into two parts. The first part (the pre-accounting major) usually taken in the first two years must be completed before formal admission into the accountancy major. The second part (Professional School) is usually taken in the last two years after formal admission into the accountancy major.

Summary of Requirements:

Pre-accounting Major (48)
 Business Core Classes (26)
 Math, Economics, Writing and Communications (22)*
 Professional School (64)
 Pro-school business core classes (32)
 Accounting Courses (36)
 University General Education Requirements (36)
 Unrestricted Electives (32)
 *12 credits from Pre-business major satisfy University General Education Requirements.

Total Required for Graduation (180)

Accounting Courses in the Professional Program—Accountancy (BS) (36 credits)

Accounting students must complete 36 credits of accounting courses—28 credits in required courses and 8 credits in two of the five elective courses.

Once in the Accountancy major, students must continue to earn a C or better (not C–) in their ACTG classes for graduation and prerequisite purposes. In the first instance of a student earning lower than a C in an ACTG class, he/she must repeat the class. In the second instance of a student earning lower than a C in an ACTG class, he/she is removed from the Accountancy major and thus should see an advisor to discuss options.

Required:

ACTG 317. External Reporting I (4)
 ACTG 318. External Reporting II (4)
 ACTG 319. External Reporting III (4)
 ACTG 321. Cost Management I (4)
 ACTG 325. Introduction to Taxation (4)
 ACTG 378. Accounting Information Management (4)
 ACTG 427/ACTG 527. Assurance and Attestation Services (4)

Electives:

ACTG 417/ACTG 517. Advanced Accounting (4)
 ACTG 420/ACTG 520. IT Auditing (4)
 ACTG 422/ACTG 522. Strategic Cost Management (4)
 ACTG 425/ACTG 525. Advanced Taxation (4)
 ACTG 429/ACTG 529. Topics in Accounting (4)

The accountancy program typically begins in students' junior year with a lock-step series of accounting courses designed to provide a solid knowledge base in accounting procedures and the accounting profession. During fall term students take ACTG 317, followed by ACTG 318 and either ACTG 321 or ACTG 378 during winter term and ACTG 319 and either ACTG 321 or ACTG 378 during spring term. ACTG 325 and ACTG 427 follow during students' senior year. Also during their senior year, students may take accounting electives that correspond to their career interests.

Students wishing to pursue the Accountancy major must also be accepted into the professional business program. Enrollment into all ACTG courses except ACTG 317 is limited to students accepted into the Accountancy program. A minimum AIB GPA of 2.75 must be earned to be eligible for admission into the Accountancy program, but a 2.75 GPA does not guarantee acceptance as admissions are competitive and subject to capacity constraints. Instructions on how to apply can be found online at the COB Student Services website. Students denied admission to the Accountancy major may reapply for the following fall if they meet minimum eligibility requirements.

Business Administration/Accountancy Curricula

The undergraduate curriculum in business administration reflects the increasingly complex economic, social, and technological aspects of modern business decision-making. Course work emphasizes

es the development of effective decision-making, an understanding of personal values and motivation, and the awareness of the interrelationships between business and society.

Pre-Accounting Program

Newly admitted students to OSU and all current OSU students who seek to complete an undergraduate degree program offered by the College of Business (COB) are designated as pre-business majors (including pre-Accounting, pre-BIS, pre-Business, pre-Finance, pre-Management and pre-Marketing). The pre-accounting program requires completion of courses within the freshman and sophomore year (see core curriculum below) that build a solid foundation for the upper-division business curricula. These courses must be completed before the student is eligible for admission to the professional business program. The pre-business course work may be completed at OSU or any accredited college or university that offers equivalent courses transferable to OSU.

Professional Business Program

Admission to the professional business program is restricted to those students who have demonstrated an ability to achieve the high standards required for professional studies. Enrollment within each academic discipline (major or option) is limited to the number of students who can be served by the faculty and facilities of that major/option.

Therefore students should strive to meet the minimum eligibility standards of their particular major of choice as well as those of the College of Business itself. Minimum standards for a particular major can often be higher. More information on the pro-school process and current competitive GPA levels for each major can be found on the Pro-School Competitive GPA section of the College of Business Advising website.

Students must apply for admission to the professional business program. To be eligible to apply, students must earn COB grades of C– or better, have 90 credits by the end of the application term, have a minimum COB GPA of 2.5, and meet the minimum standards for their particular major of choice in the All-Inclusive Business GPA. The All-Inclusive Business GPA includes all business program course work taken from OSU and transfer institution(s). Students earning an All-Inclusive Business GPA of 3.0 or above will be assured admission to the professional business program, but it does not guarantee admittance into the major of their choice. Students with an All-Inclusive Business GPA less than 3.0 will be admitted to an academic discipline (major or option) with available capacity using the following criteria: compliance with entrance requirements for the

major/option; their rank order based on their All-Inclusive Business GPA; and the contribution of the student to the diversity of viewpoints within the college.

Students who have completed their pre-business courses at a college or university other than OSU must be admitted to pre-business their first term and apply for the professional program during their first term of attendance.

Students may apply to the Accountancy major from any of the pre-business majors, including pre-Accounting, pre-BIS, pre-Business, pre-Finance, pre-Management and pre-Marketing.

Business Administration/

Accountancy Program Requirements (180)

Business Administration Core Curriculum (58)

The business administration core curriculum provides students with a broad overview of business; basic skills in accounting and quantitative methods; an understanding of the legal and social environment of business; a background in management and organizational behavior, marketing, finance, and operations management; an understanding of the entrepreneurial process; and the opportunity to integrate course work and further develop decision-making skills through the analysis of business cases.

Accountancy (36)

Accounting students must complete 36 credits of accounting courses in the accountancy program. See an academic advisor for more information.

Mathematics (8)

Basic mathematics requirements:

MTH 241. *Calculus for Management and Social Science (4)
MTH 245. *Mathematics for Management, Life, and Social Sciences (4)

Economics (8)

ECON 201. *Introduction to Microeconomics (4)
ECON 202. *Introduction to Macroeconomics (4)

Written and Oral Communication (6)

Business students also must take:

COMM 111. *Public Speaking (3)
or COMM 114. *Argument and Critical Discourse (3)
WR 222. *English Composition (3)
or WR 323. *English Composition (3)
or WR 327. *Technical Writing (3)

University General Requirements (36)

MTH 241, ECON 201/ECON 202, WR 222, WR 323 or WR 327, and COMM 111 or COMM 114 meet the university's baccalaureate core requirements for mathematics, social processes and institutions, writing II, and speech, respectively. All students must meet the other baccalaureate core requirements and the other requirements for baccalaureate degrees. (See Requirements for Baccalaureate Degrees.)

Unrestricted Electives (32)

Students are provided elective credits to enable them to achieve a degree of specialization and depth to match their interests. Students are encouraged to choose a non-business university-approved minor that consists of a minimum of 27 credits, with at least 12 credits at the upper-division level. Students are responsible for determining whether the minor has been approved for transcript visibility and to request the notation on their transcript. Students may also choose to complete a coherent set of non-business courses to support their career goals.

Sample Schedule

Pre-Accounting (Major code 770)

Freshman Year

BA 101. Business Now (6)
COMM 111. *Public Speaking (3)
or COMM 114. *Argument and Critical Discourse (3)
MTH 241. *Calculus for Management and Social Science (4)
MTH 245. *Mathematics for Management, Life, and Social Sciences (4)
Baccalaureate core, unrestricted electives (28)

Sophomore Year

BA 211. Financial Accounting (4)
BA 213. Managerial Accounting (4)
BA 233. Legal Environment of Business (2)
BA 260. Introduction to Entrepreneurship (4)
BA 276. Introduction to Statistical Inference (2)
BA 302. Business Process Management (4)
ECON 201. *Introduction to Microeconomics (4)
ECON 202. *Introduction to Macroeconomics (4)
WR 222. *English Composition (3)
or WR 323. *English Composition (3)
or WR 327. *Technical Writing (3)
Baccalaureate core, minor courses, or unrestricted electives (14)

Professional Accountancy (Major code 641)

Required Accountancy Courses

ACTG 317. External Reporting I (4)
ACTG 318. External Reporting II (4)
ACTG 319. External Reporting III (4)
ACTG 321. Cost Management I (4)
ACTG 325. Introduction to Taxation (4)
ACTG 378. Accounting Information Management (4)
ACTG 427/ACTG 527. Assurance and Attestation Services (4)

Two Elective Accountancy Courses from below:

ACTG 417/ACTG 517. Advanced Accounting (4)
ACTG 420. IT Auditing (4)
ACTG 422. Strategic Cost Management (4)
ACTG 425. Advanced Taxation (4)
ACTG 429. Topics in Accounting (4)

Business Core Classes

BA 333. Legal and Ethical Business Solutions (2)
BA 347. International Business (4)

- BA 352. Managing Individual and Team Performance (4)
 BA 353. ^Professional Development (4)
 BA 357. Operations Management (4)
 BA/FIN 340. Finance (4)
 or BA 360. Introduction to Financial Management (4)
 BA 376. Applied Quantitative Methods (2)
 BA 390. Marketing (4)
 BA 466. Integrative Strategic Experience (4)
 Baccalaureate core, minor courses or unrestricted electives (26)

Footnotes:

- * Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

OPTIONS**ACCOUNTING INFORMATION SYSTEMS OPTION**

The Accounting Information Systems (AIS) option prepares students for entry-level positions and successful careers in the information management or information systems auditing fields. The program builds on the business, accounting and computer skills classes required of all accounting students, and prepares students specifically to apply the information technologies to accounting, auditing and other business tasks.

The program of study that includes the accounting major and these selected courses has been certified by the Information Systems Audit and Control Association. Graduates of this program qualify for one year work experience toward the Certified Information Systems Auditor designation.

Sophomore Year

- BA 272. Business Application Development (4)
 (or equivalent programming course)

Junior Year

- ACTG 378. Accounting Information Management (4)¹
 BA/MGMT 364. Project Management (4)
 BA 371. Business Information Systems Analysis and Design (4)
 BA 372. Business Information Systems Design and Development (4)

Senior Year

- ACTG 420. IT Auditing (4)
 BA 479. Business Telecommunications and Networking (4)
 BA 483. Business Analytics (4)

Total=28**Footnote:**

¹ The professional business program requires completion of either BA 370 or ACTG 378. ACTG 378 is not included in the total credits completed within the option.

INTERNATIONAL BUSINESS OPTION

The International Business option prepares students for positions in organizations engaged in international trade. Students study the economic, political,

geographical, and socio-cultural factors that impact business across national boundaries. Areas of greatest opportunity for overseas assignments are with service organizations such as banks, consulting firms and accounting firms; with import/export firms; with governmental organizations; and in marketing and financial management areas of multinational firms. A career in international business can lead to exciting and rewarding opportunities abroad. Most multinational business firms, however, hire new employees first for domestic assignments in order to provide them with a thorough knowledge of the firm, its products, and its policies, or for specific assignments in one of the functional areas of the business, before providing overseas opportunities.

Because the majority of employees who eventually hold high-level positions in international business start in entry-level positions within business areas, all international business students must also complete requirements for a primary discipline within business. These disciplines include the majors in accountancy, business administration (Entrepreneurship, General Business, and Hospitality Management options), business information systems, finance, management and marketing.

Students earn this option with a minimum of one quarter term of study abroad through an international exchange or study abroad program approved by the College of Business. Students must complete a minimum of 18 quarter credits in business or business-related course work. The successfully completed course work must articulate back to OSU as courses that extend the knowledge and skills attained within the business core (that is, they cannot be used as a direct substitute for a business core course). Within the Arthur Stonehill International Business Exchange program offered through the College of Business, all courses offered by the partner schools are taught in English.

Course Requirements

- BA 347. International Business (4)
 BA 348. International Exchange Orientation (1)
 BA 349. Impact of Culture on Business (1)
 BA XXX. Minimum of 18 credits of business or business-related course work completed on an approved international exchange or study abroad program.

Total=24

Students must earn this option with one term of study abroad through an approved College of Business international exchange. Courses in these programs are taught in English.

BUSINESS ADMINISTRATION (BA, BS, CRED, HBA, HBS)**Business Administration Curricula**

The undergraduate curriculum in business administration reflects the increasingly complex economic, social, and technological aspects of modern business decision-making. Course work emphasizes the development of effective decision-making, an understanding of personal values and motivation, and the awareness of the interrelationships between business and society.

Business Administration major requirements are divided into two parts. The first part (the pre-business major), usually taken in the first two years, must be completed before formal admission into the major. The second part (Professional School) is usually taken in the last two years after formal admission into the Business Administration major.

Summary of Requirements:

- Pre-business Major (48)
 Business Core Classes (26)
 Math, Economics, Writing and Communications (22)*
 Professional School (60)
 Pro-school business core classes (36)
 Option Courses (24)
 University General Education Requirements (36)
 Unrestricted Electives (36)
 *12 credits from Pre-business major satisfy University General Education Requirements.

Total Required for Graduation (180)**Pre-Business Program**

Newly admitted students to OSU and all current OSU students who seek to complete an undergraduate degree program offered by the College of Business (COB) are designated as pre-business majors. The pre-business program requires completion of courses within the freshman and sophomore year (see core curriculum below) that build a solid foundation for the upper-division business curricula. These courses must be completed before the student is eligible for admission to the professional business program. The pre-business course work may be completed at OSU or any accredited college or university that offers equivalent courses transferable to OSU.

Professional Business Program

Admission to the professional business program is restricted to those students who have demonstrated an ability to achieve the high standards required for professional studies. Enrollment within each academic discipline (major or option) is limited to the number of students who can be served by the faculty and facilities of that major/option.

Therefore students should strive to meet the minimum eligibility standards of their particular major of choice as well

as those of the College of Business itself. Minimum standards for a particular major can often be higher. More information on the pro-school process and current competitive GPA levels for each major can be found on the Pro-School Competitive GPA section of the College of Business Advising website.

Students must apply for admission to the professional business program. To be eligible to apply, students must earn COB grades of C– or better, have 90 credits by the end of the application term, have a minimum COB GPA of 2.5, and meet the minimum standards for their particular major of choice in the All-Inclusive Business GPA. The All-Inclusive Business GPA includes all business program course work taken from OSU and transfer institution(s). Students earning an All-Inclusive Business GPA of 3.0 or above will be assured admission to the professional business program, but it does not guarantee admittance into the major of their choice. Students with an All-Inclusive Business GPA less than 3.0 will be admitted to an academic discipline (major or option) with available capacity using the following criteria: compliance with entrance requirements for the major/option; their rank order based on their All-Inclusive Business GPA; and the contribution of the student to the diversity of viewpoints within the college.

Students who have completed their pre-business courses at a college or university other than OSU must be admitted to pre-business their first term and apply for the professional program during their first term of attendance.

Business Administration Program Requirements (180)

Business Administration Core Curriculum (62)

The business administration core curriculum provides students with a broad overview of business; basic skills in accounting and quantitative methods; an understanding of the legal and social environment of business; a background in management and organizational behavior, marketing, finance, and operations management; an understanding of the entrepreneurial process; and the opportunity to integrate course work and further develop decision-making skills through the analysis of business cases.

Option (24)

Options are designed to allow students to extend their professional preparation beyond the introductory level in one or more areas. There are four options available to the Business Administration major:

1. Entrepreneurship for Business Majors
2. General Business (Cascades campus only)
3. Hospitality Management (Cascades campus only)

4. International Business

Some options need to be started in the junior year, while others can be completed all during the senior year. See an academic advisor for more information.

Mathematics (8)

Basic mathematics requirements:

MTH 241. *Calculus for Management and Social Science (4)

MTH 245. *Mathematics for Management, Life, and Social Sciences (4)

Economics (8)

ECON 201. *Introduction to Microeconomics (4)

ECON 202. *Introduction to Macroeconomics (4)

Written and Oral Communication (6)

Business students also must take:

COMM 111. *Public Speaking (3)

or COMM 114. *Argument and Critical Discourse (3)

WR 222. *English Composition (3)

or WR 323. *English Composition (3)

or WR 327. *Technical Writing (3)

University General Requirements (36)

MTH 241, ECON 201/ECON 202, WR 222, WR 323 or WR 327, and COMM 111 or COMM 114 meet the university's baccalaureate core requirements for mathematics, social processes and institutions, writing II, and speech, respectively. All students must meet the other baccalaureate core requirements and the other requirements for baccalaureate degrees. (See Earning a Degree at OSU.)

Unrestricted Electives (36)

Students are provided elective credits to enable them to achieve a degree of specialization and depth to match their interests. Students are encouraged to choose a non-business university-approved minor that consists of a minimum of 27 credits, with at least 12 credits at the upper-division level. Students are responsible for determining whether the minor has been approved for transcript visibility and to request the notation on their transcript. Students may also choose to complete a coherent set of non-business courses to support their career goals.

Pre-Business (Major code 180)

First Year

BA 101. Business Now (6)

COMM 111. *Public Speaking (3)

or COMM 114. *Argument and Critical Discourse (3)

MTH 241. *Calculus for Management and Social Science (4)

MTH 245. *Mathematics for Management, Life, and Social Sciences (4)

Baccalaureate core, unrestricted electives (28)

Second Year

BA 211. Financial Accounting (4)

BA 213. Managerial Accounting (4)

BA 233. Legal Environment of Business (2)

BA 260. Introduction to Entrepreneurship (4)

BA 276. Introduction to Statistical Inference (2)

BA 302. Business Management Processes (4)

ECON 201. *Introduction to Microeconomics (4)

ECON 202. *Introduction to Macroeconomics (4)

WR 222. *English Composition (3)

or WR 323. *English Composition (3)

or WR 327. *Technical Writing (3)

Baccalaureate core, minor courses, or unrestricted electives (14)

Professional Business (Major code 181)

Third Year

BA 333. Legal and Ethical Business Solutions (2)

BA 347. International Business (4)

BA 352. Managing Individual and Team Performance (4)

BA 353. ^Professional Development (4)

BA 357. Operations Management (4)

BA 360. Introduction to Financial Management (4)¹

BA 370. Business Systems Analysis (4)²

BA 376. Applied Quantitative Methods (2)

BA 390. Marketing (4)

Baccalaureate core, minor courses, business administration option, or unrestricted electives (13)

Fourth Year

BA 466. Integrative Strategic Experience (4)

Baccalaureate core, minor courses, business administration option or unrestricted electives (41)

Business administration option courses (24–28)

Some option courses for business administration majors are to be taken in the junior year. Students should consult an advisor to plan an appropriate schedule for their chosen option.

Footnotes:

¹Students with a discipline in finance will complete BA/FIN 340 instead of BA 360.

²Students with a discipline in accounting, finance, or business information systems will complete ACTG 378 instead of BA 370.

OPTIONS

ENTREPRENEURSHIP FOR BUSINESS MAJORS OPTION

The Entrepreneurship for Business Majors option prepares students to establish their own business, to operate in growing businesses, to become involved in family-owned businesses, or to work with innovative divisions within larger organizations. The program combines classroom study with case analysis to provide students with the knowledge and skills necessary for success.

Required Courses

BA 363. Technology and Innovation Management (4)

BA 458. Innovation and New Product Development (4)

BA 460. Venture Management (4)

BA 464. New Venture Financing (4)

BA 467. New Venture Lab (4)

Select one additional course from:

- BA 362. Social Entrepreneurship and Social Initiatives (4)
- BA 463. Family Business Management (4)
- BA 468. Technology Commercialization (4)
- BA 491. Personal Selling (4)
- or MRKT 488. Personal Selling (4)

Total=24**GENERAL BUSINESS OPTION****Available only****at OSU-Cascades Campus.**

All students in the General Business option must take 24 credits of upper-division College of Business courses in addition to the undergraduate business core curriculum. A minimum of 12 credits must be 400 level. Courses must be pre-approved by an advisor prior to beginning this option.

HOSPITALITY MANAGEMENT OPTION**Available only****at OSU-Cascades Campus.**

Course work within the Hospitality Management option is aimed at developing the students' knowledge of strategic thinking and its application to the hospitality industry. We define the hospitality industry as including all organizations that provide overnight accommodations and/or food service, to include hotels, destination resorts, hospitals, residence halls, cruise ships, etc.

Through an understanding of scanning techniques, the student will become acquainted with the major trends in the hospitality industries and will develop the analytical skills to interpret their current and future impact. From this understanding of environmental scanning and knowledge of the forces driving change in the hospitality industry, students will develop competitive methods that define the products and services in which hospitality firms need to invest to remain competitive. Students will then identify and evaluate core competencies in terms of overall value addition and competitive advantage to the firm taking into consideration both present and future effects.

Students graduating from the program are required to possess knowledge of forces in the hospitality industry's environment that drive change. Furthermore, they should be able to assess the impact of these forces on the hospitality industry, which will enable them to appreciate the cause and effect relationship between the forces that drive change and the firms within the industry. This in essence will provide students with the tools to be effective leaders in the hospitality industry.

Required Courses

- BA 487. Hospitality Financial Management (4)

BA 488. Advanced Hospitality Management (4)

MRKT 486. Customer Relationship Management (CRM) (4)

Select three from the following for 12 credits:

- BA 460. Venture Management (4)
- MGMT 364. Project Management (4)
- MGMT 453. Human Resources Management (4)
- MRKT 488. Personal Selling (4)
- MRKT 498. Services Marketing (4)

Total=24**INTERNATIONAL BUSINESS OPTION**

The International Business option prepares students for positions in organizations engaged in international trade. Students study the economic, political, geographical, and socio-cultural factors that impact business across national boundaries. Areas of greatest opportunity for overseas assignments are with service organizations such as banks, consulting firms and accounting firms; with import/export firms; with governmental organizations; and in marketing and financial management areas of multinational firms. A career in international business can lead to exciting and rewarding opportunities abroad. Most multinational business firms, however, hire new employees first for domestic assignments in order to provide them with a thorough knowledge of the firm, its products, and its policies, or for specific assignments in one of the functional areas of the business, before providing overseas opportunities.

Because the majority of employees who eventually hold high-level positions in international business start in entry-level positions within business areas, all international business students must also complete requirements for a primary discipline within business. These disciplines include the majors in accountancy, business administration (Entrepreneurship, General Business, and Hospitality Management options), business information systems, finance, management and marketing.

Students earn this option with a minimum of one quarter term of study abroad through an international exchange or study abroad program approved by the College of Business. Students must complete a minimum of 18 quarter credits in business or business-related course work. The successfully completed course work must articulate back to OSU as courses that extend the knowledge and skills attained within the business core (that is, they cannot be used as a direct substitute for a business core course). Within the Arthur Stonehill International Business Exchange program offered through the College of Business, all courses offered by the partner schools are taught in English.

Course Requirements

- BA 347. International Business (4)
- BA 348. International Exchange Orientation (1)
- BA 349. Impact of Culture on Business (1)
- BA XXX. Minimum of 18 credits of business or business-related course work completed on an approved international exchange or study abroad program.

Total=24

Students must earn this option with one term of study abroad through an approved College of Business international exchange. Courses in these programs are taught in English.

BUSINESS INFORMATION SYSTEMS (BA, BS, CRED, HBA, HBS)

The Business Information Systems (BIS) major provides research-based education that prepares undergraduate students for careers as business system analysts and information systems managers. Graduates of this program will be able to help Oregon businesses take full advantage of information systems technology and keep Oregon's business practices current and in line with rapid changes in the technology and information systems fields. The BIS Program prepares qualified BIS graduates for a variety of professional employment opportunities in private and public organizations.

Business Information Systems (BIS) major requirements are divided into two parts. The first part (the pre-BIS major), usually taken in the first two years, must be completed before formal admission into the BIS major. The second part (Professional School) is usually taken in the last two years after formal admission into the BIS major.

Summary of Requirements:

- Pre-BIS Major (48)
 - Business Core Classes (26)
 - Math, Economics, Writing and Communications (22)*
 - Professional School (60)
 - Pro-school business core classes (32)
 - BIS Courses (28)
 - University General Education Requirements (36)
 - Unrestricted Electives (36)
- *12 credits from Pre-business major satisfy University General Education Requirements.

Total Required for Graduation (180)**Required Courses in the Business Information Systems Major—(28 credits)**

BIS students must complete 28 credits of information systems courses in the professional program.

Required courses include:

- ACTG 378. Accounting Information Management (4)
- BA 272. Business Application Development (4)

- BA 364. Project Management (4)
or MGMT 364. Project Management (4)
- BA 371. Business Information Systems Analysis and Design (4)
- BA 372. Business Info Systems Design and Development (4)
- BA 479. Business Telecommunications and Networking (4)
- BA 483. Business Analytics (4)

Business Administration/ BIS Curricula

The undergraduate curriculum in business administration reflects the increasingly complex economic, social, and technological aspects of modern business decision-making. Course work emphasizes the development of effective decision-making, an understanding of personal values and motivation, and the awareness of the interrelationships between business and society.

Pre-Business Program

Newly admitted students to OSU and all current OSU students who seek to complete an undergraduate degree program offered by the College of Business (COB) are designated as pre-business majors (including pre-Accounting, pre-BIS, pre-Business, pre-Finance, pre-Management and pre-Marketing). The pre-business programs require completion of courses within the freshman and sophomore year (see core curriculum below) that build a solid foundation for the upper-division business curricula. These courses must be completed before the student is eligible for admission to the professional business program. The pre-business course work may be completed at OSU or any accredited college or university that offers equivalent courses transferable to OSU.

Professional Business Program

Admission to the professional business program is restricted to those students who have demonstrated an ability to achieve the high standards required for professional studies. Enrollment within each academic discipline (major or option) is limited to the number of students who can be served by the faculty and facilities of that major/option.

Therefore students should strive to meet the minimum eligibility standards of their particular major of choice as well as those of the College of Business itself. Minimum standards for a particular major can often be higher. More information on the pro-school process and current competitive GPA levels for each major can be found on the Pro-School Competitive GPA section of the College of Business Advising website.

Students must apply for admission to the professional business program. To be eligible to apply, students must earn COB grades of C– or better, have 90 credits by the end of the application term, have a minimum COB GPA of 2.5, and meet the

minimum standards for their particular major of choice in the All-Inclusive Business GPA. The All-Inclusive Business GPA includes all business program course work taken from OSU and transfer institution(s). Students earning an All-Inclusive Business GPA of 3.0 or above will be assured admission to the professional business program, but it does not guarantee admittance into the major of their choice. Students with an All-Inclusive Business GPA less than 3.0 will be admitted to an academic discipline (major or option) with available capacity using the following criteria: compliance with entrance requirements for the major/option; their rank order based on their All-Inclusive Business GPA; and the contribution of the student to the diversity of viewpoints within the college.

Students who have completed their pre-business courses at a college or university other than OSU must be admitted to pre-business their first term and apply for the professional program during their first term of attendance.

Students may apply to the Business Information Systems major from any of the pre-business majors, including pre-Accounting, pre-BIS, pre-Business, pre-Finance, pre-Management and pre-Marketing.

Business Administration/ Business Information Systems Requirements (180)

Business Administration Core Curriculum (58)

The business administration core curriculum provides students with a broad overview of business; basic skills in accounting and quantitative methods; an understanding of the legal and social environment of business; a background in management and organizational behavior, marketing, finance, and operations management; an understanding of the entrepreneurial process; and the opportunity to integrate course work and further develop decision-making skills through the analysis of business cases.

Business Information Systems (28)

BIS students must complete 28 credits of information systems courses in the professional program. See an academic advisor for more information.

Mathematics (8)

Basic mathematics requirements:

- MTH 241. *Calculus for Management and Social Science (4)
- MTH 245. *Mathematics for Management, Life, and Social Sciences (4)

Economics (8)

- ECON 201. *Introduction to Microeconomics (4)
- ECON 202. *Introduction to Macroeconomics (4)

Written and Oral Communication (6)

Business students also must take:

- COMM 111. *Public Speaking (3)
or COMM 114. *Argument and Critical Discourse (3)
- WR 222. *English Composition (3)
or WR 323. *English Composition (3)
or WR 327. *Technical Writing (3)

University General Requirements (36)

MTH 241, ECON 201/ECON 202, WR 222, WR 323 or WR 327, and COMM 111 or COMM 114 meet the university's baccalaureate core requirements for mathematics, social processes and institutions, writing II, and speech, respectively. All students must meet the other baccalaureate core requirements and the other requirements for baccalaureate degrees. (See Earning a Degree at OSU.)

Unrestricted Electives (36)

Students are provided elective credits to enable them to achieve a degree of specialization and depth to match their interests. Students are encouraged to choose a non-business university-approved minor that consists of a minimum of 27 credits, with at least 12 credits at the upper-division level. Students are responsible for determining whether the minor has been approved for transcript visibility and to request the notation on their transcript. Students may also choose to complete a coherent set of non-business courses to support their career goals.

Sample Four-Year Schedule

Pre-BIS (Major code 771)

First Year

- BA 101. Business Now (6)
- COMM 111. *Public Speaking (3)
or COMM 114. *Argument and Critical Discourse (3)
- MTH 241. *Calculus for Management and Social Science (4)
- MTH 245. *Mathematics for Management, Life and Social Sciences (4)
- Baccalaureate core, unrestricted electives (28)

Second Year

- BA 211. Financial Accounting (4)
- BA 213. Managerial Accounting (4)
- BA 233. Legal Environment of Business (2)
- BA 260. Introduction to Entrepreneurship (4)
- BA 272. Business Application Development (4)
- BA 276. Introduction to Statistical Inference (2)
- BA 302. Business Process Management (4)
- ECON 201. *Introduction to Microeconomics (4)
- ECON 202. *Introduction to Macroeconomics (4)
- WR 222. *English Composition (3)
or WR 323. *English Composition (3)
or WR 327. *Technical Writing (3)
- Baccalaureate core, minor courses, or unrestricted electives (10)

Professional Business Information Systems (Major code 183)

Required BIS Courses

- ACTG 378. Accounting Information Management (4)
 BA 364. Project Management (4)
 or MGMT 364. Project Management (4)
 BA 371. Business Information Systems Analysis and Design (4)
 BA 372. Business Information Systems Design and Development (4)
 BA 479. Business Telecommunications and Networking (4)
 BA 483. Business Analytics (4)

Business Core Courses

- BA 333. Legal and Ethical Business Solutions (2)
 BA 347. International Business (4)
 BA 352. Managing Individual and Team Performance (4)
 BA 353. ^Professional Development (4)
 BA 357. Operations Management (4)
 BA 360. Introduction to Financial Management (4)
 BA 376. Applied Quantitative Methods (2)
 BA 390. Marketing (4)
 BA 466. Integrative Strategic Experience (4)
 Baccalaureate core, minor courses or unrestricted electives (34)

Footnotes:

- * Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

OPTIONS

INTERNATIONAL BUSINESS OPTION

The International Business option prepares students for positions in organizations engaged in international trade. Students study the economic, political, geographical, and socio-cultural factors that impact business across national boundaries. Areas of greatest opportunity for overseas assignments are with service organizations such as banks, consulting firms and accounting firms; with import/export firms; with governmental organizations; and in marketing and financial management areas of multinational firms. A career in international business can lead to exciting and rewarding opportunities abroad. Most multinational business firms, however, hire new employees first for domestic assignments in order to provide them with a thorough knowledge of the firm, its products, and its policies, or for specific assignments in one of the functional areas of the business, before providing overseas opportunities.

Because the majority of employees who eventually hold high-level positions in international business start in entry-level positions within business areas, all international business students must also complete requirements for a primary discipline within business. These disciplines include the majors in accountancy, business administration (Entrepreneur-

ship, General Business, and Hospitality Management options), business information systems, finance, management and marketing.

Students earn this option with a minimum of one quarter term of study abroad through an international exchange or study abroad program approved by the College of Business. Students must complete a minimum of 18 quarter credits in business or business-related course work. The successfully completed course work must articulate back to OSU as courses that extend the knowledge and skills attained within the business core (that is, they cannot be used as a direct substitute for a business core course). Within the Arthur Stonehill International Business Exchange program offered through the College of Business, all courses offered by the partner schools are taught in English.

Course Requirements

- BA 347. International Business (4)
 BA 348. International Exchange Orientation (1)
 BA 349. Impact of Culture on Business (1)
 BA XXX. Minimum of 18 credits of business or business-related course work completed on an approved international exchange or study abroad program.

Total=24

Students must earn this option with one term of study abroad through an approved College of Business international exchange. Courses in these programs are taught in English.

FINANCE

(BA, BS, CRED, HBA, HBS)

The finance program of the College of Business provides nationally recognized research-based education that will prepare profession-ready graduates who: can excel in an innovative knowledge-based economy, can successfully meet certification requirements in specific finance areas (such as the Charter Financial Analyst [CFA], Certificate in Management Accounting [CMA], Certified Financial Planner [CFP]), and have engaged in experiential learning opportunities that involve applying theory to practice. The finance program will accomplish our objectives through the following:

- Rigorous, integrated undergraduate and graduate classes that translate theory to practice and center on innovation and certification preparation.
- Distinctive experiential learning opportunities for students through internships, the investment club, and finance club.
- Nationally-recognized, discipline-based research and contributions to practice.

In addition, the finance program will assist students in achieving and enhancing life-long learning skills through

contact with professional organizations and professionals in the finance field.

Finance major requirements are divided into two parts. The first part (the pre-finance major), usually taken in the first two years, must be completed before formal admission into the Finance major. The second part (Professional School) is usually taken in the last two years after formal admission into the Finance major.

Summary of Requirements:

- Pre-finance Major (48)
 Business Core Classes (26)
 Math, Economics, Writing and Communications (22)*
 Professional School (64)
 Pro-school business core classes (28)
 Finance Courses (36)
 University General Education Requirements (36)
 Unrestricted Electives (32)

*12 credits from Pre-business major satisfy University General Education Requirements.

Total Required for Graduation (180)

Finance Courses in the Professional Program—Finance (36 credits)

Finance students must complete 16 credits in required courses; 12 credits of elective finance courses; one 4-credit required finance-specific course; and 4 credits of elective finance-specific courses.

Required courses include (16):

- FIN 340. Finance (4)
 FIN 341. Investments (4)
 FIN 342. Advanced Financial Management (4)
 FIN 445. International Financial Management (4)
Finance Electives—Select three of the following courses (12):
 FIN 441. Financial Institutions (4)
 FIN 442. Financial Statement Analysis (4)
 FIN 443. Portfolio Management (4)
 FIN 444. Financial Risk Management (4)
 FIN 499. Selected Topics in Finance (4)

Finance-Specific (4):

- ACTG 378. Accounting Information Management (4)

Finance-Specific Electives—Select one of the following courses (4):

- ACTG 317. External Reporting I (4)
 ECON 330. Money and Banking (4)
 ECON 340. International Economics (4)

The finance program typically begins in students' junior year with a lock-step series of finance courses designed to provide a solid knowledge base. During fall term students take FIN 340, followed by FIN 341 and ACTG 378 during winter term and FIN 342 during spring term. FIN 445 follows during students' senior year. Also during their senior year students may take electives that correspond to their career interests.

Business Administration/ Finance Curricula

The undergraduate curriculum in business administration reflects the increasingly complex economic, social, and technological aspects of modern business decision-making. Course work emphasizes the development of effective decision-making, an understanding of personal values and motivation, and the awareness of the interrelationships between business and society.

Pre-Business Program

Newly admitted students to OSU and all current OSU students who seek to complete an undergraduate degree program offered by the College of Business (COB) are designated as pre-Business majors (including pre-Accounting, pre-BIS, pre-Business, pre-Finance, pre-Management and pre-Marketing). The pre-Business program requires completion of courses within the freshman and sophomore year (see core curriculum below) that build a solid foundation for the upper-division business curricula. These courses must be completed before the student is eligible for admission to the professional business program. The pre-business course work may be completed at OSU or any accredited college or university that offers equivalent courses transferable to OSU.

Professional Business Program

Admission to the professional business program is restricted to those students who have demonstrated an ability to achieve the high standards required for professional studies. Enrollment within each academic discipline (major or option) is limited to the number of students who can be served by the faculty and facilities of that major/option.

Therefore students should strive to meet the minimum eligibility standards of their particular major of choice as well as those of the College of Business itself. Minimum standards for a particular major can often be higher. More information on the pro-school process and current competitive GPA levels for each major can be found on the Pro-School Competitive GPA section of the College of Business Advising website.

Students must apply for admission to the professional business program. To be eligible to apply, students must earn COB grades of C– or better, have 90 credits by the end of the application term, have a minimum COB GPA of 2.5, and meet the minimum standards for their particular major of choice in the All-Inclusive Business GPA. The All-Inclusive Business GPA includes all business program course work taken from OSU and transfer institution(s). Students earning an All-Inclusive Business GPA of 3.0 or above will be assured admission to the professional business program, but it does not

guarantee admittance into the major of their choice. Students with an All-Inclusive Business GPA less than 3.0 will be admitted to an academic discipline (major or option) with available capacity using the following criteria: compliance with entrance requirements for the major/option; their rank order based on their All-Inclusive Business GPA; and the contribution of the student to the diversity of viewpoints within the college.

Students who have completed their pre-Business courses at a college or university other than OSU must be admitted to pre-business their first term and apply for the professional program during their first term of attendance.

Students may apply to the Finance major from any of the pre-Business majors, including pre-Accounting, pre-BIS, pre-Business, pre-Finance, pre-Management and pre-Marketing.

Business Administration/ Finance Program Requirements (180)

Business Administration Core Curriculum (54)

The business administration core curriculum provides students with a broad overview of business; basic skills in accounting and quantitative methods; an understanding of the legal and social environment of business; a background in management and organizational behavior, marketing, finance, and operations management; an understanding of the entrepreneurial process; and the opportunity to integrate course work and further develop decision-making skills through the analysis of business cases.

Finance (36)

Finance students must complete 36 credits of finance courses in the professional program. See an academic advisor for more information.

Mathematics (8)

Basic mathematics requirements:

MTH 241. *Calculus for Management and Social Science (4)

MTH 245. *Mathematics for Management, Life, and Social Sciences (4)

Economics (8)

ECON 201. *Introduction to Microeconomics (4)

ECON 202. *Introduction to Macroeconomics (4)

Written and Oral Communication (6)

Business students also must take:

COMM 111. *Public Speaking (3)
or COMM 114. *Argument and Critical Discourse (3)

WR 222. *English Composition (3)
or WR 323. *English Composition (3)
or WR 327. *Technical Writing (3)

University General Requirements (36)

MTH 241, ECON 201/ECON 202, WR 222, WR 323 or WR 327, and COMM 111 or COMM 114 meet the university's baccalaureate core requirements for math-

ematics, social processes and institutions, writing II, and speech, respectively. All students must meet the other baccalaureate core requirements and the other requirements for baccalaureate degrees. (See Earning a Degree at OSU.)

Unrestricted Electives (32)

Students are provided elective credits to enable them to achieve a degree of specialization and depth to match their interests. Students are encouraged to choose a non-business university-approved minor that consists of a minimum of 27 credits, with at least 12 credits at the upper-division level. Students are responsible for determining whether the minor has been approved for transcript visibility and to request the notation on their transcript. Students may also choose to complete a coherent set of non-business courses to support their career goals.

Sample Schedule

Pre-Finance (Major code 772)

First Year

BA 101. Business Now (6)

COMM 111. *Public Speaking (3)
or COMM 114. *Argument and Critical Discourse (3)

MTH 241. *Calculus for Management and Social Science (4)

MTH 245. *Mathematics for Management, Life, and Social Sciences (4)

Baccalaureate core, minor or unrestricted electives (28)

Second Year

BA 211. Financial Accounting (4)

BA 213. Managerial Accounting (4)

BA 233. Legal Environment of Business (2)

BA 260. Introduction to Entrepreneurship (4)

BA 276. Introduction to Statistical Inference (2)

BA 302. Business Process Management (4)

ECON 201. *Introduction to Microeconomics (4)

ECON 202. *Introduction to Macroeconomics (4)

WR 222. *English Composition (3)

or WR 323. *English Composition (3)

or WR 327. *Technical Writing (3)

Baccalaureate core, minor or unrestricted electives (14)

Professional Finance (Major code 182)

Required Finance Courses (16):

FIN 340. Finance (4)

FIN 341. Investments (4)

FIN 342. Advanced Financial Management (4)

FIN 445. International Financial Management (4)

Finance Electives—Select three of the following courses (12):

FIN 441. Financial Institutions (4)

FIN 442. Financial Statement Analysis (4)

FIN 443. Portfolio Management (4)

FIN 444. Financial Risk Management (4)

Finance-Specific (4):

ACTG 378. Accounting Information Management (4)

Finance-Specific Electives—Select one of the following courses (4):

- ACTG 317. External Reporting I (4)
 ECON 330. Money and Banking (4)
 ECON 340. International Economics (4)

Business Core Courses

- BA 333. Legal and Ethical Business Solutions (2)
 BA 347. International Business (4)
 BA 352. Managing Individual and Team Performance (4)
 BA 353. ^Professional Development (4)
 BA 357. Operations Management (4)
 BA 376. Applied Quantitative Methods (2)
 BA 390. Marketing (4)
 BA 466. Integrative Strategic Experience (4)
 Baccalaureate core, minor or unrestricted electives (26)

Footnotes:

- * Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

OPTIONS**INTERNATIONAL BUSINESS OPTION**

The International Business option prepares students for positions in organizations engaged in international trade. Students study the economic, political, geographical, and socio-cultural factors that impact business across national boundaries. Areas of greatest opportunity for overseas assignments are with service organizations such as banks, consulting firms and accounting firms; with import/export firms; with governmental organizations; and in marketing and financial management areas of multinational firms. A career in international business can lead to exciting and rewarding opportunities abroad. Most multinational business firms, however, hire new employees first for domestic assignments in order to provide them with a thorough knowledge of the firm, its products, and its policies, or for specific assignments in one of the functional areas of the business, before providing overseas opportunities.

Because the majority of employees who eventually hold high-level positions in international business start in entry-level positions within business areas, all international business students must also complete requirements for a primary discipline within business. These disciplines include the majors in accountancy, business administration (Entrepreneurship, General Business, and Hospitality Management options), business information systems, finance, management and marketing.

Students earn this option with a minimum of one quarter term of study abroad through an international exchange or study abroad program approved by the College of Business. Students must complete a minimum of 18 quarter credits in business or business-related course work.

The successfully completed course work must articulate back to OSU as courses that extend the knowledge and skills attained within the business core (that is, they cannot be used as a direct substitute for a business core course). Within the Arthur Stonehill International Business Exchange program offered through the College of Business, all courses offered by the partner schools are taught in English.

Course Requirements

- BA 347. International Business (4)
 BA 348. International Exchange Orientation (1)
 BA 349. Impact of Culture on Business (1)
 BA XXX. Minimum of 18 credits of business or business-related course work completed on an approved international exchange or study abroad program.

Total=24

Students must earn this option with one term of study abroad through an approved College of Business international exchange. Courses in these programs are taught in English.

INNOVATION MANAGEMENT (BA, BS, HBA, HBS)

The Innovation Management major is a double-degree program. It can only be added to a primary OSU non-business major.

Graduates of the IMDD program will gain expertise in developing new ideas and inventions and learn how to take these ideas through the innovation and commercialization process. The intent is to build upon the “technical” skills developed by students in their primary major while giving them the tools to become more productive and innovative members of the organizations where they will work. It will provide students with a foundation in business basics, such as marketing and accounting, while also building students’ expertise in the innovation and commercialization process.

This major is limited to 45 qualified students per year. Interested students should consult with the College of Business Advising Office (541-737-3716/ Bexell 214) for more detail about the declaration requirements and process.

A College of Business GPA of 2.50 (OSU grades only) and a minimum grade of C– or above is required in all completed BA course work that is relevant to the degree program. Students may not S/U courses in this major.

Requirements

- BA 215. Fundamentals of Accounting (4)
 BA 260. Introduction to Entrepreneurship (4)
 BA 351. Managing Organizations (4) or BA 352. Managing Individual and Team Performance (4)
 BA 353. ^Professional Development (4)
 BA 363. Technology and Innovation Management (4)
 BA 390. Marketing (4)

- BA 458. Innovation and New Product Development (4)
 BA 468. Technology Commercialization (4)
 MGMT 452. Leadership (4)

Total=36**Additional course work that may be completed to achieve 24 credits unique to the Innovation Management degree program:**

- BA 460. Venture Management (4)
 BA 464. New Venture Financing (4)
 MRKT 488. Personal Selling (4)

Total=12**Footnotes:**

- * Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

INTERNATIONAL STUDIES (BA, HBA)

See **International Programs** for information on the International Studies Degree.

MANAGEMENT (BA, BS, CRED, HBA, HBS)

Graduates of the management program have expertise in people, processes and projects gained through experiential learning opportunities that involve applying theory to practice. The management program prepares qualified management graduates for a variety of professional employment opportunities in the private and public sectors (government and not-for-profit).

Management major requirements are divided into two parts. The first part (the pre-management major), usually taken in the first two years, must be completed before formal admission into the management major. The second part (Professional School) is usually taken in the last two years after formal admission into the management major.

Summary of Requirements:

- Pre-management Major (48)
 Business Core Classes (26)
 Math, Economics, Writing and Communications (22)*
 Professional School (64)
 Pro-school business core classes (36)
 Management Courses (28)
 University General Education Requirements (36)
 Unrestricted Electives (32)

*12 credits from Pre-business major satisfy University General Education Requirements.

Total Required for Graduation (180)

Management students must complete 28 credits in the professional program: 24 credits in required courses and 4 credits in one of the six elective courses.

Required courses include:

- MGMT 364. Project Management (4)
 MGMT 452. Leadership (4)
 MGMT 453. Human Resources Management (4)
 MGMT 455. Influence and Negotiation (4)

MGMT 457. Supply Chain Strategy (4)
MGMT 459. Managing Ethics and
Corporate Social Responsibility (4)

Electives:

BA 362. Social Entrepreneurship and Social
Initiatives (4)
BA 363. Technology and Innovation
Management (4)
BA 432. Environmental Law and Business (4)
BA 447. Topics in International Business (4)
BA 460. Venture Management (4)
BA 463. Family Business Management (4)
MGMT 456. Management Field Practicum (4)

Business Administration/ Management Curricula

The undergraduate curriculum in business administration reflects the increasingly complex economic, social, and technological aspects of modern business decision-making. Course work emphasizes the development of effective decision-making, an understanding of personal values and motivation, and the awareness of the interrelationships between business and society.

Pre-Business Program

Newly admitted students to OSU and all current OSU students who seek to complete an undergraduate degree program offered by the College of Business (COB) are designated as pre-business majors (including pre-Accounting, pre-BIS, pre-Business, pre-Finance, pre-Management and pre-Marketing). The pre-business program requires completion of courses within the freshman and sophomore year (see core curriculum below) that build a solid foundation for the upper-division business curricula. These courses must be completed before the student is eligible for admission to the professional business program. The pre-business course work may be completed at OSU or any accredited college or university that offers equivalent courses transferable to OSU.

Professional Business Program

Admission to the professional business program is restricted to those students who have demonstrated an ability to achieve the high standards required for professional studies. Enrollment within each academic discipline (major or option) is limited to the number of students who can be served by the faculty and facilities of that major/option.

Therefore students should strive to meet the minimum eligibility standards of their particular major of choice as well as those of the College of Business itself. Minimum standards for a particular major can often be higher. More information on the pro-school process and current competitive GPA levels for each major can be found on the Pro-School Competitive GPA section of the College of Business Advising website.

Students must apply for admission to the professional business program. To be

eligible to apply, students must earn COB grades of C– or better, have 90 credits by the end of the application term, have a minimum COB GPA of 2.5, and meet the minimum standards for their particular major of choice in the All-Inclusive Business GPA. The All-Inclusive Business GPA includes all business program course work taken from OSU and transfer institution(s). Students earning an All-Inclusive Business GPA of 3.0 or above will be assured admission to the professional business program, but it does not guarantee admittance into the major of their choice. Students with an All-Inclusive Business GPA less than 3.0 will be admitted to an academic discipline (major or option) with available capacity using the following criteria: compliance with entrance requirements for the major/option; their rank order based on their All-Inclusive Business GPA; and the contribution of the student to the diversity of viewpoints within the college.

Students who have completed their pre-business courses at a college or university other than OSU must be admitted to pre-business their first term and apply for the professional program during their first term of attendance.

Students may apply to the Management major from any of the pre-business majors, including pre-Accounting, pre-BIS, pre-Business, pre-Finance, pre-Management and pre-Marketing.

Business Administration/ Management Program Requirements (180)

Business Administration Core Curriculum (62)

The business administration core curriculum provides students with a broad overview of business; basic skills in accounting and quantitative methods; an understanding of the legal and social environment of business; a background in management and organizational behavior, marketing, finance, and operations management; an understanding of the entrepreneurial process; and the opportunity to integrate course work and further develop decision-making skills through the analysis of business cases.

Management (28)

Management students must complete 28 credits of management courses in the professional program. See an academic advisor for more information.

Mathematics (8)

Basic mathematics requirements:

MTH 241. *Calculus for Management and Social Science (4)
MTH 245. *Mathematics for Management, Life, and Social Sciences (4)

Economics (8)

ECON 201. *Introduction to Microeconomics (4)
ECON 202. *Introduction to Macroeconomics (4)

Written and Oral Communication (6) Business students also must take:

COMM 111. *Public Speaking (3)
or COMM 114. *Argument and Critical Discourse (3)
WR 222. *English Composition (3)
or WR 323. *English Composition (3)
or WR 327. *Technical Writing (3)

University General Requirements (36)

MTH 241, ECON 201/ECON 202, WR 222, WR 323 or WR 327, and COMM 111 or COMM 114 meet the university's baccalaureate core requirements for mathematics, social processes and institutions, writing II, and speech, respectively. All students must meet the other baccalaureate core requirements and the other requirements for baccalaureate degrees. (See Earning a Degree at OSU.)

Unrestricted Electives (32)

Students are provided elective credits to enable them to achieve a degree of specialization and depth to match their interests. Students are encouraged to choose a non-business university-approved minor that consists of a minimum of 27 credits, with at least 12 credits at the upper-division level. Students are responsible for determining whether the minor has been approved for transcript visibility and to request the notation on their transcript. Students may also choose to complete a coherent set of non-business courses to support their career goals.

Sample Schedule

Pre-Management (Major code 773)

First Year

BA 101. Business Now (6)
COMM 111. *Public Speaking (3)
or COMM 114. *Argument and Critical Discourse (3)
MTH 241. *Calculus for Management and Social Science (4)
MTH 245. *Mathematics for Management, Life, and Social Sciences (4)
Baccalaureate core, minor or unrestricted electives (28)

Second Year

BA 211. Financial Accounting (4)
BA 213. Managerial Accounting (4)
BA 233. Legal Environment of Business (2)
BA 260. Introduction to Entrepreneurship (4)
BA 276. Introduction to Statistical Inference (2)
BA 302. Business Process Management (4)
ECON 201. *Introduction to Microeconomics (4)
ECON 202. *Introduction to Macroeconomics (4)
WR 222. *English Composition (3)
or WR 323. *English Composition (3)
or WR 327. *Technical Writing (3)
Baccalaureate core, minor or unrestricted electives (14)

Professional Management (Major code 196)

Required Courses

MGMT 364. Project Management (4)

- MGMT 452. Leadership (4)
 MGMT 453. Human Resources Management (4)
 MGMT 455. Influence and Negotiation (4)
 MGMT 457. Supply Chain Strategy (4)
 MGMT 459. Managing Ethics and Corporate Social Responsibility (4)

Electives

- BA 362. Social Entrepreneurship and Social Initiatives (4)
 BA 363. Technology and Innovation Management (4)
 BA 447. Topics in International Business (4)
 BA 460. Venture Management (4)
 BA 463. Family Business Management (4)
 MGMT 456. Management Field Practicum (4)

Business Core Courses

- BA 333. Legal and Ethical Business Solutions (2)
 BA 347. International Business (4)
 BA 352. Managing Individual and Team Performance (4)
 BA 353. ^Professional Development (4)
 BA 357. Operations Management (4)
 BA 360. Introduction to Financial Management (4)
 BA 370. Business Information Systems Overview (4)
 BA 376. Applied Quantitative Methods (2)
 BA 390. Marketing (4)
 BA 466. Integrative Strategic Experience (1–4)
 Baccalaureate core, minor or unrestricted electives (26)

Footnotes:

- * Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

OPTIONS

INTERNATIONAL BUSINESS OPTION

The International Business option prepares students for positions in organizations engaged in international trade. Students study the economic, political, geographical, and socio-cultural factors that impact business across national boundaries. Areas of greatest opportunity for overseas assignments are with service organizations such as banks, consulting firms and accounting firms; with import/export firms; with governmental organizations; and in marketing and financial management areas of multinational firms. A career in international business can lead to exciting and rewarding opportunities abroad. Most multinational business firms, however, hire new employees first for domestic assignments in order to provide them with a thorough knowledge of the firm, its products, and its policies, or for specific assignments in one of the functional areas of the business, before providing overseas opportunities.

Because the majority of employees who eventually hold high-level positions in international business start in entry-level positions within business areas, all international business students must also

complete requirements for a primary discipline within business. These disciplines include the majors in accountancy, business administration (Entrepreneurship, General Business, and Hospitality Management options), business information systems, finance, management and marketing.

Students earn this option with a minimum of one quarter term of study abroad through an international exchange or study abroad program approved by the College of Business. Students must complete a minimum of 18 quarter credits in business or business-related course work. The successfully completed course work must articulate back to OSU as courses that extend the knowledge and skills attained within the business core (that is, they cannot be used as a direct substitute for a business core course). Within the Arthur Stonehill International Business Exchange program offered through the College of Business, all courses offered by the partner schools are taught in English.

Course Requirements

- BA 347. International Business (4)
 BA 348. International Exchange Orientation (1)
 BA 349. Impact of Culture on Business (1)
 BA XXX. Minimum of 18 credits of business or business-related course work completed on an approved international exchange or study abroad program.

Total=24

Students must earn this option with one term of study abroad through an approved College of Business international exchange. Courses in these programs are taught in English.

MARKETING (BA, BS, CRED, HBA, HBS)

The marketing program of the College of Business provides nationally recognized research-based education that will prepare profession-ready graduates who can excel in an innovation economy. Graduates of our program will have expertise in marketing, promotion, product management and planning and branding gained through experiential learning opportunities that involve applying theory to practice. In addition, the marketing program will assist marketing students in achieving and enhancing lifelong learning skills through contact with professional organizations and professionals in the marketing field.

Marketing major requirements are divided into two parts. The first part (the pre-Marketing major), usually taken in the first two years, must be completed before formal admission into the Marketing major. The second part (Professional School) is usually taken in the last two years after formal admission into the Marketing major.

Business Administration/Marketing Curricula

The undergraduate curriculum in business administration reflects the increasingly complex economic, social, and technological aspects of modern business decision-making. Course work emphasizes the development of effective decision-making, an understanding of personal values and motivation, and the awareness of the interrelationships between business and society.

Summary of Requirements:

- Pre-Marketing Major (48)
 Business Core Classes (26)
 Math, Economics, Writing and Communications (22)
 (Also fulfill 12 credits University General Education Requirements)
 Professional School (72)
 Pro-school business core classes (36)
 Marketing Courses (32)
 University General Education Requirements (36)
 (48 required total, 12 in pre-business core)
 Unrestricted Electives (28)

Total Required for Graduation (180)

Pre-Marketing Major (Major code 774)—First and Second Year

Newly admitted students to OSU and all current OSU students who seek to complete an undergraduate degree program offered by the College of Business (COB) are designated as pre-business majors (including pre-Accounting, pre-BIS, pre-Business, pre-Finance, pre-Management and pre-Marketing). The pre-business major requires completion of courses within the freshman and sophomore year (see core curriculum below) that build a solid foundation for the upper-division business curricula. These courses must be completed before the student is eligible for admission to the professional school and Marketing major. The pre-business course work may be completed at OSU or any accredited college or university that offers equivalent courses transferable to OSU.

Pre-Marketing Core (48)

Business Classes (26)

- BA 101. Business Now (6)
 BA 211. Financial Accounting (4)
 BA 213. Managerial Accounting (4)
 BA 233. Legal Environment of Business (2)
 BA 260. Introduction to Entrepreneurship (4)
 BA 276. Introduction to Statistical Inference (2)
 BA 302. Business Process Management (4)

Mathematics (8)

Basic mathematics requirements:

- MTH 241. *Calculus for Management and Social Science (4)
 MTH 245. *Mathematics for Management, Life, and Social Sciences (4)

Economics (8)

ECON 201. *Introduction to Microeconomics (4)

ECON 202. *Introduction to Macroeconomics (4)

Written and Oral Communication (6)
Business students also must take:

COMM 111. *Public Speaking (3) or COMM 114. *Argument and Critical Discourse (3)

WR 222. *English Composition (3) or WR 323. *English Composition (3) or WR 327. *Technical Writing (3)

In addition to the pre-marketing core, 42 credits of baccalaureate core, minor and/or unrestricted electives should be taken to achieve junior standing.

University General Requirements (36)

MTH 241, ECON 201/ECON 202, WR 222, WR 323 or WR 327, and COMM 111 or COMM 114 meet the university's baccalaureate core requirements for mathematics, social processes and institutions, writing II, and speech, respectively. All students must meet the other baccalaureate core requirements and the other requirements for baccalaureate degrees. (See Earning a Degree at OSU.)

Sample Schedule**Pre-Marketing (Major code 774)****First Year (45 credits)**

BA 101. Business Now (6)

COMM 111. *Public Speaking (3) or COMM 114. *Argument and Critical Discourse (3)

MTH 241. *Calculus for Management and Social Science (4)

MTH 245. *Mathematics for Management, Life, and Social Sciences (4)

Baccalaureate core, minor or unrestricted electives (28)

Second Year (45 credits)

BA 211. Financial Accounting (4)

BA 213. Managerial Accounting (4)

BA 233. Legal Environment of Business (2)

BA 260. Introduction to Entrepreneurship (4)

BA 276. Introduction to Statistical Inference (2)

BA 302. Business Process Management (4)

ECON 201. *Introduction to Microeconomics (4)

ECON 202. *Introduction to Macroeconomics (4)

WR 222. *English Composition (3)

or WR 323. *English Composition (3) or WR 327. *Technical Writing (3)

Baccalaureate core, minor or unrestricted electives (14)

Professional Marketing (Major code 799)**Professional Business Program**

Admission to the professional business program is restricted to those students who have demonstrated an ability to achieve the high standards required for professional studies. Enrollment within each academic discipline (major or option) is limited to the number of students who can be served by the faculty and

facilities of that major/option.

Therefore students should strive to meet the minimum eligibility standards of their particular major of choice as well as those of the College of Business itself. Minimum standards for a particular major can often be higher. More information on the pro-school process and current competitive GPA levels for each major can be found on the Pro-School Competitive GPA section of the College of Business Advising website.

Students must apply for admission to the professional business program. To be eligible to apply, students must earn COB grades of C– or better, have 90 credits by the end of the application term, have a minimum COB GPA of 2.5, and meet the minimum standards for their particular major of choice in the All-Inclusive Business GPA. The All-Inclusive Business GPA includes all business program course work taken from OSU and transfer institution(s). Students earning an All-Inclusive Business GPA of 3.0 or above will be assured admission to the professional business program, but it does not guarantee admittance into the major of their choice. Students with an All-Inclusive Business GPA less than 3.0 will be admitted to an academic discipline (major or option) with available capacity using the following criteria: compliance with entrance requirements for the major/option; their rank order based on their All-Inclusive Business GPA; and the contribution of the student to the diversity of viewpoints within the college.

Students who have completed their pre-business courses at a college or university other than OSU must be admitted to pre-business their first term and apply for the professional program during their first term of attendance.

Third and Fourth Year

Admission to the Marketing major is restricted to those students who have demonstrated an ability to achieve the high standards required for professional studies. Enrollment within each academic discipline (major or option) is limited to the number of students who can be served by the faculty and facilities of that major/option.

Students must apply for admission to the professional business program. To be eligible to apply, students must earn COB grades of C– or better, have 90 credits by the end of the application term, and have a minimum All-Inclusive Business GPA of 2.5. The All-Inclusive Business GPA includes all business program course work taken from OSU and transfer institution(s). Students earning an All-Inclusive Business GPA of 3.0 or above will be assured admission to the professional business program, but it does not guarantee admittance into the major of their choice. Students with an All-Inclusive

Business GPA less than 3.0 will be admitted to an academic discipline (major or option) with available capacity using the following criteria: their rank order based on their All-Inclusive Business GPA; compliance with entrance requirements for the major/option; and the contribution of the student to the diversity of viewpoints within the college.

Students who have completed their pre-business courses at a college or university other than OSU must be admitted to the pre-business major in their first term and apply for the professional school with the major of their choice during their first term of attendance.

Students may apply to the Marketing major from any of the pre-business majors, including pre-Accounting, pre-BIS, pre-Business, pre-Finance, pre-Management and pre-Marketing.

Marketing Major Requirements (68)**Pro-school Core Curriculum (36)**

The pro-school business core curriculum provides students with a broad overview of business; basic skills in accounting and quantitative methods; an understanding of the legal and social environment of business; a background in management and organizational behavior, marketing, finance, and operations management; an understanding of the entrepreneurial process; and the opportunity to integrate course work and further develop decision-making skills through the analysis of business cases.

Pro-Business Core Courses (36)

BA 333. Legal and Ethical Business Solutions (2)

BA 347. International Business (4)

BA 352. Managing Individual and Team Performance (4)

BA 353. ^Professional Development (4)

BA 357. Operations Management (4)

BA 360. Introduction to Financial Management (4)

BA 370. Business Information Systems Overview (4)

BA 376. Applied Quantitative Methods (2)

BA 390. Marketing (4)

BA 466. Integrative Strategic Experience (4)

Marketing Major Courses (32)

Marketing major courses provide students with expertise in marketing, promotion, product management and planning and branding gained through learning marketing theory then applying that theory in experiential learning opportunities that involve applying theory to practice.

Required Courses Include (24):

MRKT 396. Fundamentals of Marketing Research (4) *C or better required.*

MRKT 488. Personal Selling (4)

MRKT 489. Personal Selling Skills Development (4)

MRKT 492. Consumer Behavior (4)

MRKT 496. Marketing Research Practicum (4)

or MRKT 486. Customer Relationship Management (CRM) (4)
MRKT 499. Marketing Policy (4)

Marketing Electives (8)
Select two courses from the following:

BA 458. Innovation and New Product Development (4)
MRKT 493. Advertising Management (4)
MRKT 495. Retail Management (4)
MRKT 497. Global Marketing (4)
MRKT 498. Services Marketing (4)

In addition, 22 credits of baccalaureate core, minor or unrestricted electives should be taken in the junior and senior years to achieve the 180 credits required for graduation.

Sample Schedule - Professional School: Marketing Major (Major code 799)

Junior Year (45 credits)

BA 333. Legal and Ethical Business Solutions (2)
BA 347. International Business (4)
BA 352. Managing Individual and Team Performance (4)
BA 353. ^Professional Development (4)
BA 357. Operations Management (4)
BA 360. Introduction to Financial Management (4)
BA 370. Business Information Systems Overview (4)
BA 376. Applied Quantitative Methods (2)
BA 390. Marketing (4)
MRKT 396. Fundamentals of Marketing Research (4) *C or better required.*
Baccalaureate core, minor or unrestricted electives (9)

Senior Year (45 credits)

BA 466. Integrative Strategic Experience (4)
MRKT 488. Personal Selling (4)
MRKT 489. Personal Selling Skills Development (4)
MRKT 492. Consumer Behavior (4)
MRKT 496. Marketing Research Practicum (4) or MRKT 486. Customer Relationship Management (CRM) (4)
MRKT 499. Marketing Policy (4)
Two marketing electives (8)
Baccalaureate core, minor or unrestricted electives (13)

Unrestricted Electives (28)

Students are provided elective credits to enable them to achieve a degree of specialization and depth to match their interests. Students are encouraged to choose a non-business university-approved minor that consists of a minimum of 27 credits, with at least 12 credits at the upper-division level. Students are responsible for determining whether the minor has been approved for transcript visibility and to request the notation on their transcript. Students may also choose to complete a coherent set of non-business courses to support their career goals.

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

OPTIONS

INTERNATIONAL BUSINESS OPTION

The International Business option prepares students for positions in organizations engaged in international trade. Students study the economic, political, geographical, and socio-cultural factors that impact business across national boundaries. Areas of greatest opportunity for overseas assignments are with service organizations such as banks, consulting firms and accounting firms; with import/export firms; with governmental organizations; and in marketing and financial management areas of multinational firms. A career in international business can lead to exciting and rewarding opportunities abroad. Most multinational business firms, however, hire new employees first for domestic assignments in order to provide them with a thorough knowledge of the firm, its products, and its policies, or for specific assignments in one of the functional areas of the business, before providing overseas opportunities.

Because the majority of employees who eventually hold high-level positions in international business start in entry-level positions within business areas, all international business students must also complete requirements for a primary discipline within business. These disciplines include the majors in accountancy, business administration (Entrepreneurship, General Business, and Hospitality Management options), business information systems, finance, management and marketing.

Students earn this option with a minimum of one quarter term of study abroad through an international exchange or study abroad program approved by the College of Business. Students must complete a minimum of 18 quarter credits in business or business-related course work. The successfully completed course work must articulate back to OSU as courses that extend the knowledge and skills attained within the business core (that is, they cannot be used as a direct substitute for a business core course). Within the Arthur Stonehill International Business Exchange program offered through the College of Business, all courses offered by the partner schools are taught in English.

Course Requirements

BA 347. International Business (4)
BA 348. International Exchange Orientation (1)
BA 349. Impact of Culture on Business (1)
BA XXX. Minimum of 18 credits of business or business-related course work completed on an approved international exchange or study aboard program.

Total=24

Students must earn this option with one term of study abroad through an ap-

proved College of Business international exchange. Courses in these programs are taught in English.

BUSINESS AND ENTREPRENEURSHIP MINOR

Also available via Ecampus.

The Business and Entrepreneurship minor teaches students to recognize business opportunities, equips them with skills to secure funding, and provides insight on how to manage the commercialization of the business opportunity. Fundamental business classes are combined with those designed to specifically address the challenges of launching a new venture or an idea within an existing organization. With an innovative curriculum taught by dedicated professors, the Business and Entrepreneurship minor provides a fundamental stepping stone on the road to identifying and commercializing business opportunities in any type of organization.

Interested students must view an on-line orientation and meet requirements stated therein before they can declare the minor.

Required Courses

BA 215. Fundamentals of Accounting (4)
or [BA 211. Financial Accounting (4)
and BA 213. Managerial Accounting (4)]
BA 260. Introduction to Entrepreneurship (4)
BA 351. Managing Organizations (4)
or BA 352. Managing Individual and Team Performance (4)
BA 360. Introduction to Financial Management (4)
or BA/FIN 340. Finance (4)
or ENGR 390. Engineering Economy (3)
BA 390. Marketing (4)
ECON 201. *Introduction to Microeconomics (4)
or AREC 250. *Introduction to Environmental Economics and Policy (3)
and AREC 311. Intermediate Microeconomic Theory I (4)

Note: Registration access to these substitutes is generally not allowed for minors. However, some students may have access to them via Honors College or previous status as a business major.

Elective: Select one of the following courses

BA 230. Business Law I (4)
BA/FIN 341. Investments (4)
BA/FIN 342. Advanced Financial Management (4)
BA 357. Operations Management (4)
BA 362. Social Entrepreneurship and Social Initiatives (4)
BA 363. Technology and Innovation Management (4)
BA/MGMT 364. Project Management (4)
BA 365. Family Business Management (4)
BA/MRKT 396. Fundamentals of Marketing Research (4)
BA/MGMT 452. Leadership (4)
BA/MGMT 453. Human Resources Management (4)

- BA 460. Venture Management (4)
- BA 463. Family Business Management (4)
- BA 467. New Venture Laboratory (4)
- BA 468. Technology Commercialization (4)
- BA/MRKT 492. Consumer Behavior (4)
- BA/MRKT 495. Retail Management (4)
- BA/MRKT 497. Global Marketing (4)

Any other upper-division ACTG or BA course may be used as the elective IF prior approval is obtained from the College of Business Advising Office.

Total=27

To earn the minor upon graduation, students must meet all of the following:

- Earn a minimum of C- in each of their minor courses (all courses must be taken A-F grading)
- Complete over 50 percent of their minor with OSU credits
- Have minimum 2.5 GPA (OSU grades) in all required minor course work

For further information, please contact the Office of Student Services, 214 Bexell Hall, 541-737-3716.

POSTBACCALAUREATE CERTIFICATE IN ACCOUNTING

Available on the OSU-Cascades Campus only.

Students holding a bachelor's degree and interested in an accounting education at OSU, may look into earning a second bachelor's degree in Accountancy by contacting the College of Business Office of Student Services in 214 Bexell Hall, 541-737-3716. Another option is to contact the College of Business Graduate Programs Office for information about how to specialize one's MBA in Accounting (300 Bexell Hall or 541-737-5510).

GRADUATE MAJORS

BUSINESS ADMINISTRATION (MBA, PhD)

Graduate Areas of Concentration
Clean technology, commercialization, executive leadership, global operations, marketing, research thesis, wealth management

The MBA program represents a broad, yet responsive, general management curriculum with an entrepreneurial focus that crosses the functional disciplines of business and is enhanced by advanced management and contemporary topics course work. The MBA program is open to both business and nonbusiness undergraduates. Its advanced management emphasis creates practical value-added content for all students.

The MBA program is intended to provide the broad knowledge and skills necessary to become competent and responsible managers. As a result of completing the OSU MBA program, you will be able to create, build and manage

innovative, socially responsible, and sustainable enterprises in a global business environment. The OSU MBA program will also give you an understanding of how sustainable business meets economic, social and environmental needs without compromising the future of any of them. Sustainability is woven into our curriculum—so that when you leave, you'll be able to be smart, daring and make a positive impact on your world.

Persons interested in the MBA Program should write: Graduate Business Programs, College of Business, Bexell 209, OSU, Corvallis, OR 97331-2603, or email: osumba@bus.oregonstate.edu.

The MBA is an accelerated management program with an experiential component and an emphasis on innovation, sustainability, technology and entrepreneurship. The program is designed to provide our graduates with the necessary skills to solve complex business problems and to successfully compete in the business marketplace. Foundation courses include such fundamentals as business law, accounting, finance, operations, management, and marketing. Advanced courses explore contemporary business topics in depth, with an emphasis on sustainability, technology, entrepreneurship and innovation in the global economy. Course work is completed in tandem with the experiential component of the program, the Integrated Business Project (IBP).

With the IBP, student teams are tasked with creating fact-based, research-driven business plans for the companies of their choice. Whether developing an entrepreneurial venture from scratch or providing an established business with new direction and growth potential, students become active in their own education. As the cornerstone of the College of Business MBA, the IBP program has a lasting impact, not only on students, but on commerce and industry in Oregon.

The MBA program is an intensive, fast-paced program designed to guide students through a rigorous foundation and core curriculum, while allowing them to pursue their interests and push their boundaries. Throughout, students learn to build teams, integrate disciplines, work under pressure and multitask. In short, the same skills they will rely on when they leave campus.

GRADUATE OPTIONS UNDER MASTER OF BUSINESS ADMINISTRATION DEGREE

COMMERCIALIZATION OPTION

The Commercialization graduate option, within the Master of Business Administration (MBA) program, emphasizes innovation, technology commercialization, and entrepreneurship to prepare graduates to assume leadership roles in emerg-

ing business organizations. Working with a cross-disciplinary, multinational team over a nine-month period, graduates create a research-driven, investor-ready business plan to take an innovative idea to market. Your team will participate in a business plan competition judged by seasoned entrepreneurs, executives, and venture capitalists who will provide valuable feedback from an investor perspective. You will also have weekly meetings with faculty advisors and industry mentors to guide the development of your business plan.

The Commercialization graduate option requires 45 credits of course work, including 30 credits of general MBA courses, 12 credits within the Commercialization graduate option and 3 credits of elective course work.

General MBA Course Work (30)

- BA 528. Financial and Cost Analysis (3)
- BA 540. Corporate Finance (3)
- BA 543. Financial Markets and Institutions (3)
- BA 550. Organization Leadership and Management (3)
- BA 555. Practical Business Analysis (3)
- BA 561. Supply Chain Management (3)
- BA 562. Managing Projects (3)
- BA 569. Advanced Strategic Management (3)
- BA 572. Advanced Information Systems (3)
- BA 590. Marketing Management (3)

Commercialization Graduate Option Course Work (12)

- BA 531. Business Law – Technology/New Ventures (3)
- BA 560. Venture Planning (3)
- BA 567. Special Topics in Management: Colloquium (3)
- BA 568. Integrated Business Project (3)

GLOBAL OPERATIONS OPTION

The Global Operations graduate option, within our existing Master of Business Administration (MBA) program, offers students an alternative focus for their MBA that includes acquiring a solid mastery of international operations and supply chain management concepts and methods. This MBA option prepares graduates for operations and supply chain management in the service and manufacturing industries.

The Global Operations graduate option requires a total of 45 credits, including 9 credits of track-specific course work and 6 credits of track-related elective courses.

General MBA Course Work (30)

- BA 528. Financial and Cost Analysis (3)
- BA 531. Business Law-Technology/New Ventures (3)
- or BA 533 Business Law for Managers (3)
- BA 540. Corporate Finance (3)
- BA 550. Organization Leadership and Management (3)
- BA 555. Practical Business Analysis (3)
- BA 561. Supply Chain Management (3)
- BA 562. Managing Projects (3)
- BA 569. Advanced Strategic Management (3)

BA 572. Advanced Information Systems (3)
BA 590. Marketing Management (3)

Option-Specific Courses (15–17)

BA 551. Global Supply and Sourcing (3)
BA 552. Global Service Operations and Logistics (3)
BA 554. Global Operations Capstone (3)

Complete at least two of the following restricted electives:

BA 532. Environmental Law and Business (4)
MGMT 553. Human Resources Management (4)
MGMT 559. Managing Ethics and Corporate Social Responsibility (4)
MGMT 571. Ethical Leadership (3)
MGMT 574. Negotiations (3)
MRKT 592. Consumer Behavior (4)
MRKT 594. Marketing Channels (4)
MRKT 595. Retail Management (4)
MRKT 597. Global Marketing (4)

Total=45

RESEARCH THESIS OPTION

The Research Thesis graduate option, within the Master of Business Administration (MBA) program, is intended to offer students and College of Business faculty with joint research interests, an opportunity to engage in research as part of the student's MBA program. Students can design, execute, and report on business research problems and their solutions. These may include an analysis of existing academic literature and the formulation of research questions and research plans. Students may also collect and analyze data and report on research findings in both an oral and written format.

The Research Thesis graduate option requires a minimum of 46 credits of course work, including 33 credits of general MBA courses and a minimum of 13 credits within the Research Thesis option.

General MBA Course Work (33)

BA 528. Financial and Cost Analysis (3)
BA 531. Business Law–Technology/New Ventures (3)
BA 540. Corporate Finance (3)
BA 543. Financial Markets and Institutions (3)
BA 550. Organization Leadership and Management (3)
BA 555. Practical Business Analysis (3)
BA 561. Supply Chain Management (3)
BA 562. Managing Projects (3)
BA 569. Advanced Strategic Management (3)
BA 572. Advanced Information Systems (3)
BA 590. Marketing Management (3)

Research Thesis Option (13)

BA 503. Thesis (6)
BA 505. Reading and Conference (4)
MRKT 596. Marketing Research Design and Methods (3)

WEALTH MANAGEMENT OPTION

The Wealth Management graduate option within the Master of Business Administration (MBA) program, helps

prepare graduates for careers in financial planning and wealth management. The curriculum includes course work required by the Certified Financial Planner (CFP) certification and also provides students with greater depth of knowledge in asset valuation and portfolio management required in the wealth management industry and for the Chartered Financial Analyst (CFA) designation.

The Wealth Management graduate option requires 54 credits of course work, including 24 credits of general MBA courses, 26 credits within the WM option and 4 credits of option-specific elective course work.

General MBA Course Work (24)

BA 528. Financial and Cost Analysis (3)
BA 540. Corporate Finance (3)
BA 543. Financial Markets and Institutions (3)
BA 550. Organization Leadership and Management (3)
BA 555. Practical Business Analysis (3)
BA 569. Advanced Strategic Management (3)
BA 572. Advanced Information Systems (3)
BA 590. Marketing Management (3)

Wealth Management Option Course Work (26)

FIN 542. Investments (3)
FIN 543. Portfolio Management (4)
FIN 544. Financial Risk Management (4)
FIN 551. Financial Planning I (6)
(Prerequisites: BA 528, FIN 542)
FIN 552. Financial Planning II (3)
(Prerequisites: FIN 551)
FIN 553. Financial Planning III (6)
(Prerequisites: FIN 552)

Elective course options (4)

MRKT 588. Personal Selling (4)
ST 541. Probability, Computing, and Simulation in Statistics (4)

GRADUATE OPTIONS UNDER PHD IN BUSINESS ADMINISTRATION

ACCOUNTING OPTION

Graduate option for the PhD in Business Administration.

Basic Program

AEC 512. Microeconomic Theory I (4)
AEC 513. Microeconomic Theory II (4)
AEC 523. Preliminaries for Quantitative Methods (4)
AEC 625. Advanced Econometrics I (4)
AEC 627. Computational Economics (4)
BA 611. Teaching Effectiveness (1,1)
BA 613. Seminar in Business Research Methods (3)
DHE 607. Seminar: Foundations of Research (3)

Advanced Program

ACTG 620. Foundations of Accounting Research (3)
ACTG 621. Financial Accounting (3)
ACTG 622. Managerial Accounting (3)
ACTG 623. Taxation (3)
BA 602. Independent Study (3)
BA 640. Foundations of Financial Research

(3)

BA 641. Corporate Finance (3)

Additional Courses to Fulfill PhD Requirements

BA 603. Thesis/Dissertation (36)
BA 607. Seminar (8)
BA 642. Capital Markets (3)
ST 511. Methods of Data Analysis (4)
ST 551. Statistical Methods (4)
ST 552. Statistical Methods (4)

INNOVATION/COMMERCIALIZATION OPTION

Graduate option for the PhD in Business Administration.

Basic Program

AEC 512. Microeconomic Theory I (4)
AEC 513. Microeconomic Theory II (4)
AEC 523. Preliminaries for Quantitative Methods (4)
AEC 625. Advanced Econometrics I (4)
AEC 627. Computational Economics (4)
BA 611. Teaching Effectiveness (1,1)
BA 613. Seminar in Business Research Methods (3)
DHE 607. Seminar: Foundations of Research (3)

Advanced Program

BA 602. Independent Study (3)
BA 650. Organizational Behavior (3)
BA 660. Foundations of Entrepreneurial Research (3)
BA 661. Organizational Theory (3)
BA 662. Corporate Entrepreneurship and New Ventures (3)
BA 663. Strategic Management (3)
BA 664. Technology Innovation and NPD (3)
BA 690. Marketing and Commercialization (3)

Additional Courses to Fulfill PhD Requirements

BA 603. Thesis/Dissertation (36)
BA 607. Seminar (8)
BA 642. Capital Markets (3)
ST 511. Methods of Data Analysis (4)
ST 551. Statistical Methods (4)
ST 552. Statistical Methods (4)

BUSINESS ADMINISTRATION AND ACCOUNTANCY (MBAA)

The Master of Business Administration and Accountancy is a one-year master's program for students with an undergraduate degree in accounting. It allows accounting students to receive an undergraduate degree and a master's degree during their five years of university study required to become a CPA. As an integrated program, the MBAA is designed to allow students the opportunity to plan early enough in their accounting education program to enable them to receive both an undergraduate degree and a graduate degree. The MBAA is also designed to accommodate postbaccalaureate students wishing to prepare for accounting careers by completing a two-year plan of study.

Fall Term

ACTG 516. Accounting Research and Analysis (3)
 ACTG 522. Strategic Cost Management (4)
 BA 555. Practical Business Analysis
 BA 569. Advanced Strategic Management (3)
 BA 590. New Product Development (3)

Winter Term

ACTG 517. Advanced Accounting (4)
 BA 531. Business Law–Technology/New Ventures (3)
 BA 540. Corporate Finance (3)
 BA 561. Supply Chain Management (3)
 BA 562. Managing Projects (3)

Spring Term

ACTG 518. Accounting Theory and Practice (6)
 ACTG 520. IT Auditing (4)
 ACTG 525. Advanced Taxation (4)
 BA 550. Organization Leadership and Management (3)
 Elective (3–4)

Total Credits 45**MBAA Accounting Courses****Required**

ACTG 317. External Reporting I (4)
 ACTG 318. External Reporting II (4)
 ACTG 319. External Reporting III (4)
 ACTG 321. Cost Management I (4)
 ACTG 325. Introduction to Taxation (4)
 ACTG 378. Accounting Information Management (4)
 ACTG 427. Assurance and Attestation Services (4)
 ACTG 516. Accounting Research and Analysis (3)
 ACTG 518. Accounting Theory and Practice (6)

Any three from below:

ACTG 517. Advanced Accounting (4)
 ACTG 520. IT Auditing (4)
 ACTG 522. Strategic Cost Management (4)
 ACTG 525. Advanced Taxation (4)

One-Year Schedule of Courses for Students with an Undergraduate Accountancy Degree

Course schedule for students with an undergraduate degree equivalent to the OSU Accountancy degree.

Fall (12–16)

ACTG 516. Accounting Research and Analysis (3)
 ACTG 522. Strategic Cost Management (4)*
 BA 555. Practical Business Analysis (3)
 BA 569. Advanced Strategic Management (3)
 BA 590. New Product Development (3)

Winter (12–16)

ACTG 517. Advanced Accounting (4)*
 BA 531. Business Law–Technology/New Ventures (3)
 BA 540. Corporate Finance (3)
 BA 561. Supply Chain Management (3)
 BA 562. Managing Projects (3)

Spring (13–17)

ACTG 518. Accounting Theory and Practice (6)
 ACTG 520. IT Auditing (4)*
 ACTG 525. Advanced Taxation (4)*

BA 550. Organization Leadership and Management (3)

Total=45**Footnote:**

* Students take 3 of these 4 electives depending upon courses taken for undergraduate credit.

Two-Year Schedule of Courses for Students without an Undergraduate Accountancy Degree

Course schedule for students without an undergraduate accountancy degree equivalent to the OSU Accountancy degree. Students must have all MBA admission prerequisites completed before they begin classes in the fall of their first year including BA 211 and BA 213.

The course total is 81 credits over two years. Elective credits are included to ensure a minimum of 12 credits per term for financial aid or visa concerns.

First Year**Fall (12+)**

ACTG 317. External Reporting I (4)
 BA 555. Practical Business Analysis (3)
 BA 590. New Product Development (3)
 Elective

Winter (14)

ACTG 318. External Reporting II (4)
 ACTG 378. Accounting Information Management (4)
 BA 531. Business Law–Technology/New Ventures (3)
 BA 540. Corporate Finance (3)

Spring (15)

ACTG 319. External Reporting III (4)
 ACTG 321. Cost Management I (4)
 ACTG 520. IT Auditing (4)
 BA 550. Organization Leadership and Management (3)

Second Year**Fall (14)**

ACTG 427. Assurance and Attestation Services (4)
 ACTG 516. Accounting Research and Analysis (3)
 ACTG 522. Strategic Cost Management (4)
 BA 569. Advanced Strategic Management (3)

Winter (13)

ACTG 325. Introduction to Taxation (4)
 ACTG 517. Advanced Accounting (4)
 BA 561. Supply Chain Management (3)
 BA 562. Managing Projects (3)

Spring (12+)

ACTG 518. Accounting Theory and Practice (6)
 ACTG 525. Advanced Taxation (4)

Total=81**Summary of Programs in Accountancy**

Both the one-year and two-year MBAA programs require 53 total accounting related credits (32 undergraduate accounting credits and 21 graduate accounting credits) and 24 business related total credits in the MBA program.

ACCOUNTING COURSES

ACTG 317. EXTERNAL REPORTING I (4). Examines the theory and practice of financial accounting, the processing and controls phases of the accounting system, and reporting to external parties. Emphasis is placed on the accounting cycle and financial statement structure and content. The emphasis on the accounting cycle includes the processing and tracing of transaction data from source documents to financial statements. **PREREQS:** BA 211 and BA 213 and grade of C or better in the prereqs and departmental approval.

ACTG 318. EXTERNAL REPORTING II (4). Continuation from ACTG 317 and the theory and practice of financial accounting and the reporting to external parties. Covers financial reporting objectives to provide information that is useful in investment and credit decisions, in assessing cash flow prospects, and about company resources and claims to those resources. **PREREQS:** ACTG 317 and grade of C or better in the prereqs and junior standing and departmental approval.

ACTG 319. EXTERNAL REPORTING III (4). Continuation from ACTG 318 and the theory and practice of financial accounting and the reporting to external parties. Covers financial reporting objectives to provide information that is useful in investment and credit decisions, in assessing cash flow prospects, and about company resources and claims to those resources. **PREREQS:** ACTG 318 and grade of C or better in the prereq and departmental approval.

ACTG 321. COST MANAGEMENT I (4). Reinforces and builds on the language and concepts of management accounting. Emphasizes different models for product costing and examines their effects on profit planning, budgeting, motivation, and control. **PREREQS:** ACTG 317 and grade of C or better in the prereqs or departmental approval.

ACTG 325. INTRODUCTION TO TAXATION (4). Provides a broad overview of the federal tax system as it applies to business entities that includes fundamental concepts related to tax compliance, tax planning, tax research, and other specialized topics. Emphasis is placed on the role of taxes in decision making and the ability to derive and communicate solutions to tax-related problems. **PREREQS:** ACTG 319 and grade of C or better in the prereqs or acceptance into either the Accounting Certificate Program or the MBA Program. Departmental approval required.

ACTG 378. ACCOUNTING INFORMATION MANAGEMENT (4). Introduces students to the field of information management. Topics include information systems technology, the strategic role of IT, the business applications of networks, databases and Internet technologies, the system life cycle model, systems analysis and design methodologies, and the development and implementation of information systems. Lec/rec. **PREREQS:** (BA 213 and (BA 271 or BA 302) and (BA 275 or BA 276)) and grade of C or better in the prereqs and junior standing and departmental approval required.

ACTG 417. ADVANCED ACCOUNTING (4). An advanced course in financial accounting theory. Covers corporate combinations, consolidated financial statements, and government and not-for-profit accounting. **PREREQS:** ACTG 319 and grade of C or better in the prereqs and departmental approval required.

ACTG 420. IT AUDITING (4). Explores key information systems issues such as planning, acquisition, delivery, and monitoring from a risk and control perspective. Students learn to use IT audit standards, guidelines, and frameworks and build data analysis tool skills. **PREREQS:** ((ACTG 317 or BA 372) and ACTG 378) and grade of C or better in the prereqs and departmental approval required.

ACTG 422. STRATEGIC COST MANAGEMENT (4). Continuation of concepts and processes of management accounting. Emphasizes relevant costs, cost accumulation and allocation, segment performance measurement and control and quantitative techniques. **PREREQS:** ACTG 321 and BA 357 and grade of C or better in the prereqs and departmental approval.

ACTG 425. ADVANCED TAXATION (4). Examination of the federal tax system as it applies to corporations, partnerships, and estates and trusts. Emphasis is placed on understanding tax planning for business owners and refining the ability to research tax issues. **PREREQS:** ACTG 325 and grade of C or better in the prereqs and departmental approval.

ACTG 427. ASSURANCE AND ATTESTATION SERVICES (4). Assertions of enterprises gain credibility when examined by an independent third party. Assurance and attestation provide credibility. Coverage includes ethics, risk, materiality, internal control, evidence and reporting. **PREREQS:** ACTG 319 and grade of C or better in the prereqs or acceptance into either the Accounting Certificate Program or the MBA Program. Departmental approval required.

ACTG 429. TOPICS IN ACCOUNTING (1-4). Analysis of current topics in accounting. Topics will vary from term to term. **PREREQS:** Departmental approval required.

ACTG 516. ACCOUNTING RESEARCH AND ANALYSIS (3). Emphasis on financial accounting, tax and auditing research and analysis and communication of conclusions in the context of accounting case studies. **PREREQS:** Acceptance into the OSU MBAA or approval of the director of the Accounting Program.

ACTG 517. ADVANCED ACCOUNTING (4). An advanced course in financial accounting theory. Corporate combinations, consolidated financial statements, foreign operations and subsidiaries, partnerships, and sole proprietorships; contemporary issues in financial accounting. **PREREQS:** ACTG 319 and grade of C or better in the prereqs and departmental approval required.

ACTG 518. ACCOUNTING THEORY AND PRACTICE I (3). Expands and integrates knowledge of US and international generally accepted accounting principles (GAAP) in a rigorous study of the design, selection, and consequences of various models of financial reporting. **PREREQS:** (ACTG 516 and ACTG 517) and Acceptance into the OSU MBAA or approval by the Director of the Accounting Program.

ACTG 519. ACCOUNTING THEORY AND PRACTICE II (3). Study of the design, selection, and consequences of various models of financial reporting. Research accounting treatments for complex facts and circumstances with ambiguous accounting guidance. Build on financial reporting models to develop in-depth understanding and application of accounting practice. **PREREQS:** ACTG 518 and Acceptance into the OSU Accountancy MBA program or approval of the director of the Accounting Program.

ACTG 520. IT AUDITING (4). Explores key information systems issues such as planning, acquisition, delivery, and monitoring from a risk and control perspective. Students learn to use IT audit standards, guidelines, and frameworks and build data analysis tool skills. **PREREQS:** Grade of "C" or better in (ACTG 317 or BA 372) and ACTG 378. Departmental approval required.

ACTG 522. STRATEGIC COST MANAGEMENT (4). Continuation of concepts and processes of management accounting. Emphasizes relevant costs, cost accumulation and allocation, segment performance measurement and control and quantitative techniques. **PREREQS:** ACTG 321 and BA 357 with a C or better and departmental approval required.

ACTG 524. ENVIRONMENTAL ACCOUNTING AND REPORTING (3). Covers economic and

accounting issues relating to corporate social responsibility and environmental performance. Designed to foster an understanding of how the measurement of social and environmental performance contributes to business goals and strategies. The course provides a framework to help understand the nature, purpose and importance of decision-useful and decision-facilitating CSR and environmental information. **PREREQS:** BA 528

ACTG 525. ADVANCED TAXATION (4). Examination of the federal tax system as it applies to corporations, partnerships, and estates and trusts. Emphasis is placed on understanding tax planning for business owners and refining the ability to research tax issues. **PREREQS:** ACTG 325 with grade of C or better and departmental approval required.

ACTG 527. ASSURANCE AND ATTESTATION SERVICES (4). Assertions of enterprises gain credibility when examined by an independent third party. Assurance and attestation provide credibility. Coverage includes ethics, risk, materiality, internal control, evidence and reporting. **PREREQS:** ACTG 319 and grade of C or better in the prereqs and departmental approval required.

ACTG 529. TOPICS IN ACCOUNTING (1-4). Analysis of current topics in accounting. Topics will vary from term to term. **PREREQS:** Instructor approval required.

ACTG 620. FOUNDATIONS OF ACCOUNTING RESEARCH (3). Introduces first-year doctoral students to accounting research by discussing the development of modern accounting theory, relating it to theories in economics and finance, and exposing students to the different areas of and methodologies used in accounting research. Also begins a survey of classic and contemporary literature in the area of financial accounting research. Specific financial accounting topics may change from quarter to quarter, but sample topics include earnings management, earnings quality, and voluntary disclosure. **PREREQS:** Doctoral student status and departmental approval.

ACTG 621. FINANCIAL ACCOUNTING RESEARCH (3). Surveys classic and contemporary research in the area of financial accounting. Specific topics may change from quarter to quarter, but sample topics include the value relevance of accounting information, post earnings announcement drift, the residual income model, analysts' use accounting information, and market-based assessments of the usefulness and limitations of alternative accounting measurements and disclosures. **PREREQS:** Doctoral student status and departmental approval.

ACTG 623. TAX RESEARCH (3). Surveys classic and contemporary research in the area of taxation. Specific topics may change from quarter to quarter, but sample topics include tax vs. nontax costs in business decisions, book-tax differences, taxes and financial reporting, multijurisdictional tax issues, and tax avoidance. **PREREQS:** Doctoral student status and departmental approval

■ BUSINESS ADMINISTRATION COURSES

BA 101. BUSINESS NOW (6). Presents an integrated view of both established and entrepreneurial business organizations by studying their common processes and characteristics. Introduces theory and develops basic skills in the areas of management, finance, accounting and marketing. Lec/lab/rec.

BA 150. EXPLORING ENTREPRENEURSHIP (1). Participants are challenged with economic concepts and projects. Inspirational speakers address key topics concerning all aspects of business and leadership development. Students must be registered for Young Entrepreneurs Business Week Camp to receive credit for the course. Graded P/N.

BA 151. EXPLORING INVESTING (1). Students participating in Investing Week will learn about basic investment vehicles and the principles of evaluating a potential investment. Students will also learn how to understand the financial market system and how it affects their personal and business life. Students will be assigned a role as a junior analyst with "Toots, Toots and Peabody," and critically assess the benefits and strengths of individual investment vehicles. Graded P/N.

BA 152. EXPLORING SOCIAL ENTREPRENEURSHIP (1). Provides an immersive experience regarding responsible business practices. In addition, from an entrepreneurial perspective, students have the opportunity to explore ways in which real social change is being conducted worldwide. Graded P/N.

BA 160. B-ENGAGED (2). Understand and accomplish college-level academic work and explore OSU resources and options that will enhance your college experience and success. Opportunity to connect with faculty and peers with common interests in a supportive learning environment. **PREREQS:** Students must live in Weatherford Residential College or have instructor approval.

BA 161. WEATHERFORD GARAGE-- AWARENESS TO ACTION (3). First course in a two-course sequence. Begins a conversation on self-management, offering opportunities for active reflection on critical skill sets necessary for success in today's global market. Builds a foundation of entrepreneurial knowledge and gaining a competitive edge while becoming aware of your role in managing your own career. **PREREQS:** Students must live in Weatherford Residential College or have instructor approval.

BA 162. WEATHERFORD GARAGE-- IDEAS TO REALITY (3). Second course in a two-course sequence. Topics include evaluating entrepreneurial capabilities, creativity and innovation, opportunity recognition, impression management, and responsible business practices. Continues a conversation on self-management, offering opportunities for active reflection on critical skill sets necessary for success in today's global market. **PREREQS:** BA 161 and Students must live in Weatherford Residential College or have instructor approval.

BA 199. SPECIAL STUDIES (1-4). Graded P/N. This course is repeatable for a maximum of 4 credits.

BA 211. FINANCIAL ACCOUNTING (4). Accounting information from the perspective of external users, principally investors and creditors. Emphasis on the preparation and interpretation of financial statements, income recognition and determination, and asset valuation. **PREREQS:** (MTH 111 or MTH 241 or MTH 251 or MTH 251H) or Placement Test and a minimum grade of C- or better. Sophomore standing.

BA 213. MANAGERIAL ACCOUNTING (4). Accounting information from the perspective of management users with an emphasis on data accumulation for product costing, planning, and performance evaluation and control. **PREREQS:** BA 211 and a minimum grade of C- or better.

BA 215. FUNDAMENTALS OF ACCOUNTING (4). Looks at how the accounting model reflects business transactions and events. Students are introduced to both financial and managerial accounting and the creation, interpretation, and analysis of financial statements. In addition, students obtain an understanding of the determination, organization, and management of costs and revenues including management decisions based upon this information.

BA 215H. FUNDAMENTALS OF ACCOUNTING (4). Looks at how the accounting model reflects business transactions and events. Students are introduced to both financial and managerial accounting and the creation, interpretation, and analysis of financial statements. In addition,

students obtain an understanding of the determination, organization, and management of costs and revenues including management decisions based upon this information.

PREREQS: Honors College approval required.

BA 230. BUSINESS LAW I (4). Nature and function of law in our business society. Obligations arising out of agency, contract formation and breach, crimes, torts, warranty, regulation of competition, and international aspects thereof.

PREREQS: Sophomore standing. Not open to business majors.

BA 233. LEGAL ENVIRONMENT OF BUSINESS (2). Nature and function of U.S. law in our business society. Obligations arising out of agency and employment law, contract formation and breach, warranty, crimes and torts. **PREREQS:** Sophomore standing.

BA 260. INTRODUCTION TO ENTREPRENEURSHIP (4). Topics include evaluating entrepreneurial capabilities, creativity, business plan creation, opportunity assessment and feasibility analysis, business implementation, new product introduction, and seeking funds. **PREREQS:** Sophomore standing.

BA 260H. INTRODUCTION TO ENTREPRENEURSHIP (4). Topics include evaluating entrepreneurial capabilities, creativity, business plan creation, opportunity assessment and feasibility analysis, business implementation, new product introduction, and seeking funds. **PREREQS:** Sophomore standing and Honors College approval required.

BA 272. BUSINESS APPLICATION DEVELOPMENT (4). Introduction to business programming with C#.NET. Beginning programming skills and concepts, .NET programming environment, object-oriented and event-oriented models, and console applications.

BA 276. INTRODUCTION TO STATISTICAL INFERENCE (2). An introductory level statistics course on data analysis and statistical inference with an emphasis on business applications. Coverage includes descriptive statistics, random variables, probability distributions, sampling and sampling distributions, statistical inference for means and proportions using one and two samples. It serves as a prerequisite to BA 376. **PREREQS:** (MTH 245 or MTH 251 or MTH 251H) and a minimum grade of C- or better. Sophomore standing.

BA 302. BUSINESS PROCESS MANAGEMENT (4). Integrates core concepts from Business Information Systems (BIS) with those of Operations Management and introduces a process-oriented view of the flows of materials, information and services through and across organizations. The course helps students identify information-bearing events, assess and improve process efficiency, learn to model and analyze business processes, and understand the interactions between human behavior and process design. Hands-on, case-based assignments and labs allow students to practice the principles addressed. **PREREQS:** (MTH 245 or MTH 251 or MTH 251H) and a minimum grade of C- or better. Sophomore standing.

BA 333. LEGAL AND ETHICAL BUSINESS SOLUTIONS (2). Legal and ethical regulations of U.S. and global business organizations including financial, human resources, operations and marketing functions. Emphasizes legal and ethical strategies for entrepreneurs including business entity selection, raising capital and managing intellectual property. **PREREQS:** ((BA 230 or BA 233) and (ECON 201 or ECON 201H)) and a minimum grade of C- or better. Junior standing.

BA 347. INTERNATIONAL BUSINESS (4). Integrated view of international business including current patterns of international business, socioeconomic and geopolitical systems within countries as they affect the conduct of business, major theories explaining international business

transactions, financial forms and institutions that facilitate international transactions, and the interface between nation states and the firms conducting foreign business activities. **PREREQS:** (ECON 202 or ECON 202H) and a minimum grade of C- or better. Junior standing.

BA 348. INTERNATIONAL EXCHANGE ORIENTATION (1). Consists of large-group sessions as well as small-group break-out sessions for each country individually. It is vital to attend all sessions as valuable information pertaining to your study abroad opportunity will be presented. Graded P/N.

BA 349. IMPACT OF CULTURE ON BUSINESS (1). A requirement of all students participating in a College of Business-approved international exchange program and for completing the College of Business International Business option. The major emphasis is for students to reflect on their experience while studying, living and traveling in a foreign culture and for them to determine how the foreign culture impacts how they would conduct business in that country. Graded P/N. **PREREQS:** BA 348* and a minimum grade of C- or better.

BA 351. MANAGING ORGANIZATIONS (4). A systems perspective to understanding the management functions of planning, organizing, leading and controlling. Ethical and diversity issues are addressed as they are relevant in entrepreneurial and established ventures. **PREREQS:** Junior standing. No credit for business administration majors.

BA 352. MANAGING INDIVIDUAL AND TEAM PERFORMANCE (4). Diagnose individual and small-group behavior and develop skill in improving individual and small-group performance in entrepreneurial and established ventures. Emphasis on professional skill development and the practical application of theory and research. Concepts of ethics, diversity and cross-cultural relations are integrated throughout the course. **PREREQS:** (COMM 111 or COMM 111H or COMM 114 or COMM 114H) and a minimum grade of C- or better. Junior standing.

BA 352H. MANAGING INDIVIDUAL AND TEAM PERFORMANCE (4). Diagnose individual and small-group behavior and develop skill in improving individual and small-group performance in entrepreneurial and established ventures. Emphasis on professional skill development and the practical application of theory and research. Concepts of ethics, diversity and cross-cultural relations are integrated throughout the course. **PREREQS:** (COMM 111 or COMM 111H or COMM 114 or COMM 114H) and a minimum grade of C- or better. Junior standing. Honors College approval required.

BA 353. ^PROFESSIONAL DEVELOPMENT (4). Designed to improve the ability of students to describe their accomplishments and sell themselves in situations like professional networking, company meetings, response to proposals for services, and interviews. Emphasizes writing skills, workplace integration, verbal communication, and preparation of developmental roadmaps that will lead students to success within their chosen profession. (Writing Intensive Course) **PREREQS:** ((COMM 111 or COMM 111H or COMM 114 or COMM 114H) and (WR 222 or WR 323 or WR 327)) and BA 101 and a minimum grade of C- or better. Junior standing.

BA 357. OPERATIONS MANAGEMENT (4). Decision making in managing the production of goods and services: product planning, process planning, facility planning, control of quantity, cost and quality. Special emphasis on exponential forecasting, inventory management, work methods, project management, productivity improvement, and international comparisons. **PREREQS:** (BA 275 or BA 276) and a minimum grade of C- or better. Junior standing.

BA 360. INTRODUCTION TO FINANCIAL MANAGEMENT (4). Explore the issues facing a financial manager in new business ventures,

small businesses, and corporations. Focus on the role of the financial manager in business settings, explores the functions of a financial manager in financial analysis, forecasting, planning, and control; asset and liability management; capital budgeting; and raising funds for new business ventures, small businesses, and corporations. **PREREQS:** ((BA 213 or BA 215 or BA 215H) and (ECON 201 or ECON 201H or AREC 250)) and a minimum grade of C- or better.

BA 360H. INTRODUCTION TO FINANCIAL MANAGEMENT (4). Explore the issues facing a financial manager in new business ventures, small businesses, and corporations. Focus on the role of the financial manager in business settings, explores the functions of a financial manager in financial analysis, forecasting, planning, and control; asset and liability management; capital budgeting; and raising funds for new business ventures, small businesses, and corporations. **PREREQS:** ((BA 213 or BA 215 or BA 215H) and (ECON 201 or ECON 201H or AREC 250)) and a minimum grade of C- or better. Honors College approval required.

BA 362. SOCIAL ENTREPRENEURSHIP AND SOCIAL INITIATIVES (4). The core concepts of entrepreneurship, using entrepreneurship to craft innovative responses to social problems. Entrepreneurial skills are as valuable in the social sector as they are in business. Includes both profit and non-profit firms that have programs designed to create social value. **PREREQS:** Junior standing.

BA 363. TECHNOLOGY AND INNOVATION MANAGEMENT (4). Introduces students to the fundamentals of managing innovation and technology toward the production of intellectual assets; how innovations are created, evaluated and leveraged within business strategy; and how innovation is managed within various business environments. **PREREQS:** (BA 260 or BA 260H) and a minimum grade of C- or better.

BA 364. PROJECT MANAGEMENT (4). Covers the tools available to project managers, the human and organizational dimensions in different project environments, some computer applications, cases, and a project. **PREREQS:** (BA 351 or BA 352 or BA 352H) and a minimum grade of C- or better.

BA 365. FAMILY BUSINESS MANAGEMENT (4). Focuses on the opportunities and the problems characteristic of family businesses: entrepreneurship, management succession, transfer of ownership, mixing family and business roles, family conflicts, personnel issues, non-family employees, and outside advisors. Taught via Ecampus only. **PREREQS:** Junior standing or instructor permission.

BA 370. BUSINESS INFORMATION SYSTEMS OVERVIEW (4). Introduce students to the field of information management. Topics include information systems technology, the strategic role of IT, the business applications of networks, databases and Internet technologies, and the development and implementation of information systems. Use relational database models to design a real-world case study. **PREREQS:** BA 302 and a minimum grade of C- or better. Junior standing.

BA 371. BUSINESS INFORMATION SYSTEMS ANALYSIS AND DESIGN (4). Explore systems analysis, logical design and documentation of information system (IS) applications with process-oriented methodologies. **PREREQS:** (BA 272 and ACTG 378) and a minimum grade of C- or better. Junior standing.

BA 372. BUSINESS INFORMATION SYSTEMS DESIGN AND DEVELOPMENT (4). Logical and physical design of computer-based information systems; tools and techniques that underlie the design processes. Design of an enterprise information system with CASE tools. Alternative approaches to systems design with emphasis on object-orientation. **PREREQS:** BA 371 and a minimum grade of C- or better. Junior standing.

BA 376. APPLIED QUANTITATIVE METHODS (2). An in-depth discussion on advanced quantitative methods most relevant to business students. Topics may include regression analysis, time series and forecasting, design of experiments, simulations, decision analysis, survey data analysis, data mining and computationally intensive statistical methods. **PREREQS:** BA 276 and a minimum grade of C- or better. Available to business majors only.

BA 390. MARKETING (4). Consumer and industrial markets, and activities and enterprises involved in distributing products to those markets. Objective is to develop an understanding of distribution processes, marketing problems, and marketing principles. **PREREQS:** (ECON 201 or ECON 201H or AREC 250) and a minimum grade of C- or better. Junior standing.

BA 390H. MARKETING (4). Consumer and industrial markets, and activities and enterprises involved in distributing products to those markets. Objective is to develop an understanding of distribution processes, marketing problems, and marketing principles. **PREREQS:** (ECON 201 or ECON 201H or AREC 250) and a minimum grade of C- or better. Junior standing. Honors College approval required.

BA 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

BA 405. READING AND CONFERENCE (1-16). Supervised individual work in some field of special application and interest. Subjects chosen must be approved by professor in charge. This course is repeatable for a maximum of 16 credits. **PREREQS:** Senior standing and departmental approval required.

BA 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

BA 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

BA 407H. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

BA 410. BUSINESS INTERNSHIP (1-12). Planned and supervised work experience at selected cooperating business firms. Supplementary training, conference, reports, and appraisals. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Upper-division standing and departmental approval required.

BA 432. ENVIRONMENTAL LAW AND BUSINESS (4). Covers environmental laws and regulation. Explores fundamental legal and policy issues raised by environmental law and clean energy policies and their impact on business management. **PREREQS:** Junior level standing.

BA 447. TOPICS IN INTERNATIONAL BUSINESS (1-4). Analysis of current topics in international business. Topics will vary from term to term. **PREREQS:** BA 347 and a minimum grade of C- or better.

BA 458. INNOVATION AND NEW PRODUCT DEVELOPMENT (4). Strategic management of an organization's system and technologies in support of innovation and new product/service development. Application experience with new product/service development process using problem solving skills, information management, and critical thinking. **PREREQS:** (BA 390 or BA 390H) and a minimum grade of C- or better.

BA 460. VENTURE MANAGEMENT (4). Entrepreneurial and innovation processes applied to new business start-ups, existing small businesses, and new ventures within larger organizations; new venture planning, project management, and productivity improvement. Cases and projects are used to apply concepts and to develop communication skills. **PREREQS:** ((BA 260 or BA 260H) and (BA 351 or BA 352

or BA 352H) and (BA 390 or BA 390H)) and a minimum grade of C- or better. Senior standing.

BA 463. FAMILY BUSINESS MANAGEMENT (4). Focuses on the opportunities and the problems characteristic of family businesses: entrepreneurship, management succession, transfer of ownership, mixing family and business roles, family conflicts, personnel issues, non-family employees, and outside advisors. **PREREQS:** Senior standing and instructor approval.

BA 464. NEW VENTURE FINANCING (4). Explore financial issues facing entrepreneurial business ventures: cash flow and budgets, financial analysis, financial statement forecasting, financial controls, asset management, and understanding the funding options at different points in the business life cycle including SBA loans, angel investment, venture capital, bank loans, and going public. **PREREQS:** ((BA 260 or BA 260H) and (BA 340 or FIN 340 or BA 340H or FIN 340H or BA 360)) and a minimum grade of C- or better.

BA 465. *SYSTEMS THINKING AND PRACTICE (4). Hard and soft system theories examined, methods and techniques for dealing with real-world problems; skills and dialogue techniques to identify mindsets, define problems, and explore alternative pathways for solutions. (Bacc Core Course)

BA 465H. *SYSTEMS THINKING AND PRACTICE (4). Hard and soft systems theories are examined, including methods and techniques for dealing with real-world problems; skills and dialogue techniques to identify mindsets, define problems, and explore alternative pathways for solutions. **PREREQS:** Honors College approval required.

BA 466. INTEGRATIVE STRATEGIC EXPERIENCE (4). Provides students with an overview of the basic concepts in strategic management. Students learn frameworks and models to understand and analyze a firm's external environment and internal resources in an effort to create sustainable competitive advantages. Analysis and critique of conventional conceptions of business ethics. Evaluation of ethical issues involving businesses at firm, national, and international levels. **PREREQS:** ((BA 340 or BA 340H or FIN 340 or FIN 340H or BA 360) and (BA 352 or BA 352H) and BA 357 and (BA 390 or BA 390H)) and a minimum grade of C- or better. Senior standing.

BA 467. NEW VENTURE LABORATORY (4). Entrepreneurship capstone course. Fully develop a business plan including product specs with prototype, financial analysis, market analysis, marketing plan, management structure and proposed financing. **PREREQS:** (BA 357 and BA 458) and a minimum grade of C- or better.

BA 468. TECHNOLOGY COMMERCIALIZATION (4). "Hands on" class in which students will exercise commercialization concepts on recently awarded Oregon State University patents. Students will learn a process and tools to assess the business viability of a technical idea, and to develop the best business approach for commercialization. **PREREQS:** BA 363 and a minimum grade of C- or better. Or instructor permission.

BA 479. BUSINESS TELECOMMUNICATIONS AND NETWORKING (4). Provide a fundamental understanding of the five-layer Internet model and its effects on the business environment. Planning and managing networks in support of enterprise-wide computing. Assignments involve server hardware and software configurations including DNS/DHCP server configurations, addition of clients to a network, and creating/managing user accounts. **PREREQS:** ACTG 378 and a minimum grade of C- or better. Or instructor approval.

BA 482. SMALL-BUSINESS MANAGEMENT (4). Covers the management and building of small- to mid-sized businesses that are past the

initial start-up phase. Topics such as promotion and marketing, human resource management, operations and quality control, budgeting, and risk management will be discussed in a small-business context. **PREREQS:** BA 260 (undergraduate); none for graduate course. Junior standing.

BA 483. BUSINESS ANALYTICS (4). Presents how organizations can successfully "collect, evaluate and apply information" for better decision making. Technologies such as transaction processing systems, RFID, weblogs, social networks, website usage, and online communities have the potential to reveal market trends, suppliers' preferences, and competitors' next moves. The success of an organization largely depends on its ability to take advantage of those data sets that are already available to it. **PREREQS:** BA 371 and BA 479 and a minimum grade of C- or better. Senior standing.

BA 487. HOSPITALITY FINANCIAL MANAGEMENT (4). Introduces students to the evaluation of investments in competitive products and services as sustainable strategies for the hospitality industry. **PREREQS:** (BA 360 and BA 486) and a minimum grade of C- or better in BA 360 and C- in BA 486 and senior standing.

BA 488. ADVANCED HOSPITALITY MANAGEMENT (4). Designed to provide students with an in-depth understanding of the importance of core competencies in the hospitality industry in terms of overall value addition, competitive methods, and competitive advantage, taking into consideration both present and future effects. **PREREQS:** BA 352 and a minimum grade of C- or better.

BA 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

BA 503. THESIS (1-16). This course is repeatable for a maximum of 32 credits.

BA 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

BA 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

BA 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

BA 510. BUSINESS INTERNSHIP (1-6). Planned and supervised work experience at selected cooperating business firms. Supplementary training, conferences, reports, and appraisals. This course is repeatable for a maximum of 16 credits. **PREREQS:** Graduate standing, departmental approval required.

BA 512. BUSINESS ANALYSIS AND COMMUNICATION (6). Students will be guided through a process of determining business issues or challenges given specific situations, providing reasons/justifications why these are important, proposing solutions to the identified business problems, and communicating this analysis through in-class discussions and writing. **PREREQS:** ALS 162 and/or instructor approval.

BA 513. THE ESSENCE OF BUSINESS-BUSINESS LEGAL ENVIRONMENT (3). Provides essential legal foundation for business managers in companies operating in the U.S. Emphasizes effective strategies for managers to prevent and resolve legal disputes against companies. Topics include legal issues related to the corporate form of doing business, forming and enforcing contracts, minimizing tort liability, and retaining and managing company employees and independent contractors.

BA 514. THE ESSENCE OF BUSINESS-SUSTAINABLE BUSINESS OPERATIONS (4). Provides a foundation for business managers in statistics and operations management. Emphasis on quantitative tools for sampling, interval estimation and hypothesis testing as well as operations management concepts for processes, quality systems, supply chain management,

inventory management, resource planning, and sustainable lean systems. **PREREQS:** College algebra (including probabilities).

BA 515. THE ESSENCE OF BUSINESS--ACCOUNTING AND FINANCE (4). A graduate-level survey course that provides a foundation for business managers in the concepts of accounting and finance. Emphasis on the preparation and interpretation of financial statements, income recognition and determination, data accumulation for product costing, and financial analysis, forecasting, planning, and control. **PREREQS:** College algebra.

BA 516. THE ESSENCE OF BUSINESS--MANAGEMENT AND MARKETING (4). A graduate-level survey course that provides a foundation for business managers in the concepts of management and marketing. Diagnose individual and small-group behavior and develop skill in improving individual and small-group performance in entrepreneurial and established ventures. Develop an understanding of marketing principles and an awareness of marketing challenges. **PREREQS:** Microeconomics.

BA 528. FINANCIAL AND COST ANALYSIS (3). Analysis of the balance sheet and income statement to determine profitability, risk, and rate of return; preparation of pro forma financial statements; cost measurement for products, projects, jobs, customers, and markets; strategic cost decision making for pricing and resource allocation. **PREREQS:** BA 213 with C- or higher and graduate standing.

BA 531. BUSINESS LAW - TECHNOLOGY/NEW VENTURES (3). An integrative course on managing legal and ethical issues for new ventures. Focuses on business law for founders of start-up companies including formation of new business entities, protecting intellectual property, workforce management and global issues. Topics presented from an entrepreneurial perspective and include technology law, e-commerce law and government regulation. Students develop skills to identify and resolve legal and ethical issues, deal with administrative agencies, and proactively manage legal liability. Considerations of ethics and corporate responsibility are emphasized. **PREREQS:** BA 230 and BA 233 and BA 513 or equivalent with a minimum grade of C- or better, graduate standing.

BA 532. ENVIRONMENTAL LAW AND BUSINESS (4). Covers environmental laws and regulation. Explores fundamental legal and policy issues raised by environmental law and clean energy policies and their impact on business management. **PREREQS:** Graduate standing.

BA 533. BUSINESS LAW FOR MANAGERS (3). Develops knowledge and skills about business law used by managers in global organizations. Topics covered include establishing lawful and ethical business practices; preventing and responding to compliance failures, infringement and other legal threats; effective use of contracts; and resolving disputes through litigation and alternative dispute resolution. **PREREQS:** BA 230 and BA 233 and BA 513 and PHAR 707 and PHAR 708 or equivalent.

BA 540. CORPORATE FINANCE (3). Emphasizes analytical tools to measure and manage firm value, through corporate strategies such as mergers and acquisitions, leveraged buyouts, international expansion, and new venture development. **PREREQS:** (BA 340 or FIN 340 or FIN 340H) with a minimum grade of C- or better and graduate standing.

BA 543. FINANCIAL MARKETS AND INSTITUTIONS (3). Investigates the five major financial markets: common stock, bond, derivatives, mortgage, and currency. The course examines the agents in each of these markets, the rules of trading, and the rationale of the agents participating in the different markets. **PREREQS:** (BA 340 or FIN 340 or FIN 340H) with a minimum grade of C- or better and graduate standing.

BA 550. ORGANIZATION LEADERSHIP AND MANAGEMENT (3). Organization-wide implementation issues driven by change. Provides a balanced view of the structural and human sides of organization design. **PREREQS:** BA 352 a minimum grade of C- or better and graduate standing.

BA 551. GLOBAL SUPPLY AND SOURCING (3). Focus on effectively using operations and supply chain management to make sourcing and supply decisions in international business contexts. Topics include purchasing/procurement procedures and policy, supply organization, specifications, sourcing strategy, supplier evaluation, competitive bidding, and e-procurement. Global contexts and environmentally and socially responsible supply management are emphasized. **PREREQS:** BA 561 and BA 561 Supply Chain Management (may be completed concurrently) and graduate standing.

BA 551X. PROJECT METHODOLOGY FOR SCIENTISTS (3). Integrates best practices from project management to improve leadership, quality, resource use, and productivity of projects in natural resources. Students will employ concepts, tools, and techniques from project management in a class project. Students will also analyze their experiences and evaluate the methods used.

BA 552. GLOBAL SERVICE OPERATIONS AND LOGISTICS (3). Focus on the management of global service operations including designing and managing systems to coordinate global information and material flows within and between firms in a supply chain. Covers planning operations, evaluating system alternatives, designing and researching global supply networks, examining complex adaptive systems and evaluating value stream synchronization. **PREREQS:** BA 555 and graduate standing.

BA 554. GLOBAL OPERATIONS CAPSTONE (3). Analyze business cases that address global value creation and production/delivery systems. Complete integrated business projects to identify critical operations and supply chain management issues, apply multidisciplinary knowledge, analyze and evaluate alternative solutions and write and present reports recommending firm strategies. International business and cross-cultural competencies are emphasized. **PREREQS:** BA 551 and BA 561 and graduate standing; Global Operations Track of MBA Program.

BA 555. PRACTICAL BUSINESS ANALYSIS (3). Advanced survey of quantitative business methods useful for aiding management decisions. Topics include a review of basic statistics, mathematical programming, business simulation, statistical process control, advanced regression analysis and forecasting. **PREREQS:** BA 275 with a minimum grade of C- or better graduate standing.

BA 560. VENTURE PLANNING (3). Entrepreneurial and innovation processes applied to new business start-ups, existing small businesses, and new ventures within larger organizations; emphasis on venture planning with project management. Lec/rec. **PREREQS:** ((BA 340 or BA 340H or FIN 340 or FIN 340H) and (BA 390 or BA 390H)) with a minimum grade of C- or better and graduate standing. Restricted to MBA students who are completing the Integrated Business Project (IBP).

BA 561. SUPPLY CHAIN MANAGEMENT (3). Covers tools and concepts needed to manage the entire supply chain effectively. Topics include negotiation, purchasing, logistics operations, and applying e-business tools. Emphasis on creating integrated supply chains. **PREREQS:** (BA 357 and BA 555) with a minimum grade of C- or better.

BA 562. MANAGING PROJECTS (3). Covers tools and concepts used by managers to plan and initiate business projects. Computer applications, cases and a project. **PREREQS:** (BA 352 and BA 357) with a minimum grade of C- or better and graduate standing.

BA 563. FAMILY BUSINESS MANAGEMENT (4). Focuses on the opportunities and the problems characteristic of family businesses: entrepreneurship, management succession, transfer of ownership, mixing family and business roles, family conflicts, personnel issues, non-family employees, and outside advisors. **PREREQS:** Graduate standing and instructor approval.

BA 565. SYSTEMS THINKING AND PRACTICE (4). Hard and soft system theories examined, methods and techniques for dealing with real-world problems; skills and dialogue techniques to identify mindsets, define problems, and explore alternative pathways for solutions. **PREREQS:** Graduate standing.

BA 566. CLEAN TECHNOLOGY COMMERCIALIZATION (3). Students will exercise commercialization concepts on recently awarded clean technology patents. Students will learn process and tools to assess the business viability of a technical idea, and to develop the best business approach for commercialization. Lec/rec. **PREREQS:** Graduate standing.

BA 567. SELECTED TOPICS IN MANAGEMENT (1-4). Examination of the impact of recent advances in management on contemporary business. Topic will vary from term to term. Lec/rec. This course is repeatable for a maximum of 16 credits. **PREREQS:** Graduate standing.

BA 568. INTEGRATED BUSINESS PROJECT (3). The project requires students to complete a business plan, as a means of directing the development of a business. A business plan can help focus a business idea, chart a course for strategic business development, and facilitate setting objectives and creating evaluative benchmarks of progress. To be taken during the last year of the MBA program.

BA 569. ADVANCED STRATEGIC MANAGEMENT (3). Advanced integrative case-based course on the process of systematically developing and managing firm strategies. Topics are covered from a general management perspective and include setting corporate goals and objectives, analyzing external competitive environments, understanding business models, identifying strategy options, and designing appropriate organization systems and structure for implementation of plans. International and e-business issues are integrated throughout. **PREREQS:** Graduate standing. All foundation courses.

BA 572. ADVANCED INFORMATION SYSTEMS (3). The development, implementation and management of information technology applications will be addressed. Topics will address the development and application of technology to support linkages within the organization and outside the organization. Projects will be assigned to illustrate the topics. **PREREQS:** Graduate standing.

BA 582. SMALL-BUSINESS MANAGEMENT (4). Covers the management and building of small- to mid-sized businesses that are past the initial start-up phase. Topics such as promotion and marketing, human resource management, operations and quality control, budgeting, and risk management will be discussed in a small-business context. **PREREQS:** BA 260 (undergraduate); none for graduate course. Junior standing.

BA 590. MARKETING MANAGEMENT (3). Provides students with an understanding of how a market-orientation can help firms to profitably deliver value to their targeted customers. Through a combination of lectures, in-class exercises, and case discussions, students will learn how to analyze complex marketing challenges, and make strategic decisions based on established marketing management principles. **PREREQS:** BA 390 with a minimum grade of C- or better and graduate standing.

BA 601. RESEARCH AND SCHOLARSHIP (1-16). Graded P/N. This course is repeatable for a maximum of 32 credits.

BA 602. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 32 credits.

BA 603. THESIS/DISSERTATION (1-16). Graded P/N. This course is repeatable for a maximum of 32 credits.

BA 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 32 credits.

BA 607. SEMINAR (1-16). This course is repeatable for a maximum of 32 credits.

BA 611 TEACHING EFFECTIVENESS (1-6). Provides an overview of a broad range of effective teaching techniques and common issues associated with teaching at the college level (e.g. defining learning outcomes, common pitfalls, assessing of student learning, etc.). This course is repeatable for a maximum of 6 credits. **PREREQS:** Doctoral student status.

BA 613 SEMINAR IN BUSINESS RESEARCH METHODS (3). Provides first-year business PhD students with an in-depth introduction to the most common research methodologies used by current business faculty across multiple functional disciplines. Specific research methods covered may change from quarter to quarter, but sample topics include use of basic econometric models for analysis of archival data, experimental methodologies, qualitative research techniques, and survey research. **PREREQS:** Doctoral student status and departmental approval.

BA 660. FOUNDATIONS OF ENTREPRENEURSHIP RESEARCH (3). Provides a broad overview of the foundations of entrepreneurship research, including theoretical underpinnings of the field as well as some of the common and/or promising approaches to the study of entrepreneurial phenomena. **PREREQS:** Doctoral student status and departmental approval.

BA 661. DOCTORAL SEMINAR IN ORGANIZATIONAL THEORY (3). Surveys research on classic and contemporary developments in basic organizational theory. **PREREQS:** Doctoral student status and departmental approval.

BA 662. CORPORATE ENTREPRENEURSHIP AND NEW VENTURES (3). Surveys research in the area of corporate entrepreneurship and venturing, focusing on relevant theoretical underpinnings and core concepts in the corporate entrepreneurship, entrepreneurship, and strategy literatures. **PREREQS:** Doctoral student status and departmental approval.

BA 664. TECHNOLOGY AND INNOVATION MANAGEMENT (3). Surveys research on the management of innovation and technology in organizations, focusing on innovation as an outcome (product, service, technology, practice) and on the process of generation, adoption, and implementation of innovation in organizations. **PREREQS:** Doctoral student status and departmental approval.

BA 808. WORKSHOP (1-16). Workshops aimed at practicing professionals in the discipline. Topics may vary.

■ FINANCE COURSES

FIN 340. FINANCE (4). Role and functions of a financial manager in the modern business environment in which a manager operates; formulation of financial objectives and policies; financial analysis, forecasting, planning, and control; asset management; capital budgeting; acquisition of funds through borrowing, stock issue, and by internal means; dividend policy; and international aspects of finance. **PREREQS:** ((BA 213 or BA 215 or BA 215H) and (ECON 201 or ECON 201H)) and a minimum grade of C- or better. Junior standing.

FIN 340H. FINANCE (4). Role and functions of a financial manager in the modern business

environment in which a manager operates; formulation of financial objectives and policies; financial analysis, forecasting, planning, and control; asset management; capital budgeting; acquisition of funds through borrowing, stock issue, and by internal means; dividend policy; and international aspects of finance. **PREREQS:** ((BA 213 or BA 215 or BA 215H) and (ECON 201 or ECON 201H)) and a minimum grade of C- or better. Junior standing. Honors College approval required.

FIN 341. INVESTMENTS (4). Risk and reward characteristics of investments; sources of investment information; domestic and international security markets; investment characteristics of common stocks, debt securities, convertible securities, option contracts, and investment companies; real property investment; economic market analysis; technical market analysis; tax aspects of investments; and investment management. **PREREQS:** (FIN 340 or FIN 340H or BA 340 or BA 340H or BA 360) and a minimum grade of C- or better.

FIN 342. ADVANCED FINANCIAL MANAGEMENT (4). Capital market theory and the valuation of risky assets, capital budgeting, valuing the firm's securities, capital structure theory, long-term financing alternatives, cost of capital, dividend policy, working capital management, financial analysis and planning, mergers, and takeovers. **PREREQS:** (FIN 340 or FIN 340H or BA 340 or BA 340H or BA 360) and a minimum grade of C- or better.

FIN 434. CFA PREPARATION (2-4). Provides students with structure and guidance in their preparation for the Chartered Financial Analyst (CFA) Level exam. Students systematically prepare for and are tested on the 18 sections of the exam. This course is repeatable for a maximum of 4 credits.

FIN 437. APPLIED PORTFOLIO MANAGEMENT I (2). Hands-on experience of managing two investment portfolios. Each member in the Oregon State Investment Group (OSIG) should act as a financial analyst to analyze a chosen company by performing the Discounted Cash Flow (DCF) or Residual Income Model (RIM), the relative valuation, and the SWOT analyses. The weekly seminar offers opportunities for students to present their analyses and offer comments and suggestions to other's presentations. **PREREQS:** Junior standing, instructor approval required.

FIN 438. APPLIED PORTFOLIO MANAGEMENT II (1). Each student will act as a financial analyst to analyze a chosen company using models learned in FIN 437. Provides students with an opportunity to practice security valuation and get familiar with the tools. In addition, this course will focus on various measures of portfolio performance. **PREREQS:** FIN 437 or BA 437 and a minimum grade of C- or better. Junior standing and instructor approval required.

FIN 439. APPLIED PORTFOLIO MANAGEMENT III (1). Each student will act as a financial analyst to analyze a chosen company using models learned from FIN 437. Provides students additional opportunity to practice security valuation and strengthen their understanding of the tools. In addition, this course will introduce ways to develop an efficient portfolio. **PREREQS:** FIN 437 or BA 437 and a minimum grade of C- or better. Junior standing and instructor approval required.

FIN 441. FINANCIAL INSTITUTIONS (4). Introduction of markets and institutions that form the economic system of trading financial and real assets both domestically and internationally. The introduction of concepts of financial theory, institutional detail, regulatory environments, and the history of financial markets. Topics include legal, ethical, technological, and global issues facing financial managers, markets, and institutions. **PREREQS:** FIN 341 or BA 341 or AREC 465 and with a minimum grade of C- or better. Senior standing.

FIN 442. FINANCIAL STATEMENT ANALYSIS (4). Student develop the understanding and skill to use financial statements for investment decisions, credit decisions, performance analysis, and forecasting. Three main topic areas: analysis overview, accounting analysis, and financial analysis. **PREREQS:** ACTG 317 and (BA 341 or FIN 341) and a minimum grade of C- or better. Senior standing.

FIN 443. PORTFOLIO MANAGEMENT (4). An introduction to the construction, revision, and performance evaluation of financial asset portfolios. **PREREQS:** FIN 341 or BA 341 and a minimum grade of C- or better.

FIN 444. FINANCIAL RISK MANAGEMENT (4). Investigation of financial hedging activities for corporations and financial institutions using futures, options, and other derivative securities. Identification of risk attributes, valid hedging rationales, and management of hedging programs. **PREREQS:** FIN 341 or BA 341 and a minimum grade of C- or better.

FIN 445. INTERNATIONAL FINANCIAL MANAGEMENT (4). International monetary environment; foreign exchange risk management; source and availability of funds to finance trade and multinational operations; taxation planning and control; international portfolio diversification; international banking; capital budgeting; political risk evaluation of performance. **PREREQS:** (FIN 342 or BA 342) and (BA 347 or ECON 340) and (FIN 441 or FIN 444 or BA 441 or BA 444) and a minimum grade of C- or better.

FIN 499. SELECTED TOPICS IN FINANCE (1-4). Examination to the impact of recent advances in finance on contemporary business. Topic will vary from term to term. This course is repeatable for a maximum of 16 credits. **PREREQS:** Senior standing and departmental approval.

FIN 542. INVESTMENTS (3). Introduction to the tools and concepts of security analysis and investments; basic security types, including stocks, bonds, options and futures, respective markets and to how these securities are traded; fundamental valuation techniques and theory for stocks and bonds. **PREREQS:** BA 360 or equivalent.

FIN 543. PORTFOLIO MANAGEMENT (4). An introduction to the construction, revision, and performance evaluation of financial asset portfolios. **PREREQS:** FIN 542

FIN 544. FINANCIAL RISK MANAGEMENT (4). Investigation of financial hedging activities for corporations and financial institutions using futures, options, and other derivative securities. Identification of risk attributes, valid hedging rationales, and management of hedging programs. **PREREQS:** FIN 542 and .

FIN 545. INTERNATIONAL FINANCIAL MANAGEMENT (4). International monetary environment; foreign exchange risk management; source and availability of funds to finance trade and multinational operations; taxation planning and control; international portfolio diversification; international banking; capital budgeting; political risk evaluation of performance. **PREREQS:** (FIN 342 or BA 342) and (BA 347 or ECON 340) and (FIN 441 or FIN 444 or BA 441 or BA 444) and a minimum grade of C- or better. Junior standing.

FIN 551. FINANCIAL PLANNING I (6). Fundamentals of financial planning; regulations in the financial services industry; income and debt management techniques; risk management process in financial planning; insurance planning; income tax fundamentals; tax management strategies. **PREREQS:** BA 528 and FIN 542

FIN 552. FINANCIAL PLANNING II (3). Retirement planning; qualified and non-qualified retirement plans; IRAs; legal, tax, financial and non-financial aspects of estate planning; trusts; wills; wealth transfers. **PREREQS:** FIN 551

FIN 553. FINANCIAL PLANNING III (6).

Synthesis and integration of financial planning fundamentals to develop a comprehensive financial plan; client communication. **PREREQS:** FIN 552

FIN 640. FOUNDATIONS OF FINANCIAL RESEARCH (3). Provides an in-depth introduction to the foundations of financial research with an emphasis on theoretical developments and empirical research methods. Specific topics may change from quarter to quarter, but sample topics include theory of the firm, capital structure theory, dividend policy, and event study methodology. **PREREQS:** Doctoral student status and departmental approval.

FIN 641. CORPORATE FINANCE SEMINAR (3). Survey classic and contemporary research in the area of corporate finance. Specific topics may change from quarter to quarter, but sample topics include capital structure, dividend policy, agency theory, adverse selection and signaling, and non-cooperative games with and without complete information. **PREREQS:** Doctoral student status and departmental approval.

FIN 642. CAPITAL MARKETS (3). Surveys research on capital markets. Specific topics may change from quarter to quarter, but sample topics include asset pricing models, efficient markets vs behavioral finance, market volatility, volume, new issues market, and emerging markets. **PREREQS:** Doctoral student status and departmental approval.

■ MANAGEMENT COURSES

MGMT 364. PROJECT MANAGEMENT (4). Covers the tools available to project managers, the human and organizational dimensions in different project environments, some computer applications, cases, and a project. **PREREQS:** BA 351 or BA 352 or BA 352H and a minimum grade of C- or better.

MGMT 452. LEADERSHIP (4). In-depth study of leadership research, theory and skills. Emphasis on analysis of organizational leadership situations and application of leadership skills in the workplace. **PREREQS:** BA 351 or BA 352 or BA 352H and a minimum grade of C- or better.

MGMT 453. HUMAN RESOURCES MANAGEMENT (4). Personnel administration for line supervisors and managers. Integrates systems approach to understanding government regulation of employment, resolution of workplace personnel problems, and performance-based personnel management. **PREREQS:** BA 351 or BA 352 or BA 352H

MGMT 455. INFLUENCE AND NEGOTIATION (4). Focuses on analysis, skill development and application of management research to real-life organizational influence, persuasion, negotiation and conflict management situations. **PREREQS:** BA 352 or BA 352H and a minimum grade of C- or better.

MGMT 456. MANAGEMENT FIELD PRACTICUM (4). An innovative application of key management principles and tools to real-life projects is provided. Students will be responsible for developing, designing, executing, and evaluating projects. **PREREQS:** MGMT 364 or BA 364 and a minimum grade of C- or better. Senior standing.

MGMT 457. SUPPLY CHAIN STRATEGY (4). Covers tools and concepts needed to manage the supply chain effectively. Topics include negotiation, purchasing, logistics operations, and applying e-business tools. Emphasis on creating integrated supply chains. **PREREQS:** BA 357 and a minimum grade of C- or better.

MGMT 459. MANAGING ETHICS AND CORPORATE SOCIAL RESPONSIBILITY (4). Introduces students to contemporary issues managers face making ethical and socially-responsible decisions in an increasingly competitive, transparent, and global environment. Practical examples and cases, as well as

contemporary behavioral ethics research and theory are incorporated throughout the course. **PREREQS:** (BA 352 or BA 352H) and senior standing and a minimum passing grade of C- or better.

MGMT 499. SELECTED TOPICS IN MANAGEMENT (1-4). Examination of the impact of recent advances in management on contemporary business. Topic will vary from term to term. This course is repeatable for a maximum of 16 credits. **PREREQS:** Senior standing and departmental approval.

MGMT 553. HUMAN RESOURCES MANAGEMENT (4). Personnel administration for line supervisors and managers. Integrates systems approach to understanding government regulation of employment, resolution of workplace personnel problems, and performance-based personnel management. **PREREQS:** (BA 350 or BA 352 or BA 352H) with a minimum grade of C- or better and graduate standing.

MGMT 559. MANAGING ETHICS AND CORPORATE SOCIAL RESPONSIBILITY (4). Introduces students to contemporary issues managers face making ethical and socially-responsible decisions in an increasingly competitive, transparent, and global environment. Practical examples and cases, as well as contemporary behavioral ethics research and theory are incorporated throughout the course. **PREREQS:** (BA 352 or BA 352H) and senior standing

MGMT 571. ETHICAL LEADERSHIP (3). Students will learn the theoretical paradigms of ethical conduct and decision making and consider the role of business in society. **PREREQS:** BA 550 and graduate standing.

MGMT 572. MANAGING HUMAN RESOURCES (3). Students will learn the theories of human resource management, the legal requirements for human resource practices and the practical skills to execute human resource management activities. **PREREQS:** BA 516 or equivalent with a minimum grade of C- or better and graduate standing.

MGMT 574. NEGOTIATIONS (3). Students will learn the theories of negotiation and the techniques to develop an effective negotiation style. **PREREQS:** BA 516 with a minimum grade of C- or better and graduate standing.

MGMT 650. ORGANIZATIONAL BEHAVIOR (3). Surveys research on individual differences, psychological states, and team processes related to work motivation, decision-making and performance. **PREREQS:** Doctoral student status and departmental approval.

■ MARKETING COURSES

MRKT 396. FUNDAMENTALS OF MARKETING RESEARCH (4). Introduction to the fundamentals of market research. Provides a basic understanding of marketing research and relevant decisions in the process. **PREREQS:** ((BA 275 or BA 276 or ST 202) and (BA 390 or BA 390H)) and a minimum grade of C- or better.

MRKT 486. CUSTOMER RELATIONSHIP MANAGEMENT (CRM) (4). An integration of people, process and technology. Students will learn how individuals and companies can gain the return on investment that they expect through technology implementation, service and business process mapping, employee training, customer relationship, customer life time value, technology solutions that track customer data and employee performance. **PREREQS:** BA 390 or BA 390H and senior standing.

MRKT 488. PERSONAL SELLING (4). An introductory course that focuses on two areas: the principles and theory of personal selling, and on understanding and developing the interpersonal communication skills needed for successful

personal selling. **PREREQS:** BA 390 or BA 390H and a minimum grade of C- or better.

MRKT 489. PERSONAL SELLING SKILLS DEVELOPMENT (4). Learn and develop the skills necessary for persuasive encounters in personal selling settings, such as making sales calls, preparing and delivering presentations, writing documents (sales proposals, cover letters, and resumes) and structuring logical, persuasive, prioritized arguments. **PREREQS:** MRKT 488 or BA 491 and with a minimum grade of C- or better. Senior standing.

MRKT 492. CONSUMER BEHAVIOR (4). Understanding the processes that lead to purchase, so as to improve decisions on segmentation and the appropriate marketing mix for each segment. How consumers and households make decisions, and why different individuals/groups make different decisions. Application of behavioral science concepts at individual, subcultural and cultural levels. Effects of consumerism and regulation also are considered. **PREREQS:** BA 390 or BA 390H and a minimum grade of C- or better.

MRKT 493. ADVERTISING MANAGEMENT (4). Analysis of the influence of marketing communications on the attitudes and behaviors of consumer and industrial buyers. Identification and examination of the major decisions made by marketing/advertising managers in implementing the promotional mix. **PREREQS:** BA 390 or BA 390H and a minimum grade of C- or better.

MRKT 494. MARKETING CHANNELS (4). Various channel institutions, channel design, channel coordination and implementation, and performance evaluation with special reference to business-to-business markets and technology. **PREREQS:** BA 390 or BA 390H and a minimum grade of C- or better. Senior standing.

MRKT 495. RETAIL MANAGEMENT (4). Management of retail business with emphasis on strategic planning, analysis, and control, focused on middle- and upper-middle management decisions. **PREREQS:** BA 390 or BA 390H and a minimum grade of C- or better.

MRKT 496. MARKETING RESEARCH PRACTICUM (4). Provides the student with practical experience in the collection, analysis and interpretation of primary data. **PREREQS:** MRKT 396 or BA 396 and a minimum grade of C or better. Departmental approval. Marketing majors or instructor approval required.

MRKT 497. GLOBAL MARKETING (4). Consideration of cultural, political, regulatory, economic and trade barriers in the design of marketing plans for product development, pricing, channels of distribution; and promotion alternatives in a global market. **PREREQS:** (BA 347 and (BA 390 or BA 390H)) and a minimum grade of C- or better.

MRKT 498. SERVICES MARKETING (4). Formulation of strategic and tactical marketing plans for organizations (both profit and not-for-profit) in the service sector of the economy. Projects or cases are used to provide a comprehensive experience. **PREREQS:** BA 390 or BA 390H or BA 590 and a minimum grade of C- or better.

MRKT 499. MARKETING POLICY (4). Market and competitive analysis for developing overall strategies and tactics to achieve the marketing objectives of the business enterprise. Projects or cases are used to provide a comprehensive experience. **PREREQS:** MRKT 396 or BA 396 and a minimum grade of C or better.

MRKT 581. APPLIED QUANTITATIVE MARKETING ANALYSIS (4). Includes a comprehensive presentation of quantitative methods used in marketing management. It is designed to prepare students to use quantitative techniques in making marketing decisions. Topics include ANOVA, regression, discriminant and logit

analysis, factor analysis, cluster analysis, and structural equation modeling. **PREREQS:** BA 596 or MRKT 596

MRKT 582. APPLIED QUALITATIVE

MARKETING ANALYSIS (3). Explores the uses and application of qualitative research methods to inform and improve marketing decision-making. Students will be introduced to such methods as focus group interviews, individual in-depth interviews, observational research methods, participant observation, and ethnographic immersion. Students will learn appropriate analytic strategies and reporting methodologies. **PREREQS:** BA 596 or MRKT 596

MRKT 588. PERSONAL SELLING (4). An introductory course that focuses on two areas: the principles and theory of personal selling, and on understanding and developing the interpersonal communication skills needed for successful personal selling.

MRKT 589. PERSONAL SELLING SKILLS DEVELOPMENT (4). Learn and develop the skills necessary for persuasive encounters in personal selling settings, such as making sales calls, preparing and delivering presentations, writing documents (sales proposals, cover letters, and resumes) and structuring logical, persuasive, prioritized arguments. **PREREQS:** BA 491 or MRKT 488 with a minimum grade of C- or better. Senior standing.

MRKT 592. CONSUMER BEHAVIOR (4). Understanding the processes that lead to purchase, so as to improve decisions on segmentation and the appropriate marketing mix for each segment. How consumers and households make decisions, and why different individuals/groups make different decisions. Application of behavioral science concepts at individual, subcultural and cultural levels. Effects of consumerism and regulation also are considered. **PREREQS:** (BA 390 or BA 390H or BA 590) and a minimum grade of C- or better and graduate standing.

MRKT 593. ADVERTISING MANAGEMENT (4). Analysis of the influence of marketing communications on the attitudes and behaviors of consumer and industrial buyers. Identification and examination of the major decisions made by marketing/advertising managers in implementing the promotional mix. **PREREQS:** (BA 390 or BA 390H or BA 590) and a minimum grade of C- or better and graduate standing.

MRKT 594. MARKETING CHANNELS (4).

Various channel institutions, channel design, channel coordination and implementation, and performance evaluation with special reference to business-to-business markets and technology. **PREREQS:** (BA 390 or BA 390H) with C- or higher and graduate standing.

MRKT 595. RETAIL MANAGEMENT (4).

Management of retail business with emphasis on strategic planning, analysis, and control, focused on middle- and upper-management decisions. **PREREQS:** (BA 390 or BA 390H or BA 590) and a minimum grade of C- or better and graduate standing.

MRKT 596. MARKETING RESEARCH DESIGN

AND METHODS (3). Focuses on articulating research problems, creating appropriate research design to address information needs (i.e., understanding markets, competitors, and customers), ethics (to include IRB training), and the application of diverse data collection methods, including secondary, qualitative, and quantitative methods. Measurement, sampling, and data preparation will also be addressed. **PREREQS:** BA 390 or equivalent.

MRKT 597. GLOBAL MARKETING (4).

Consideration of cultural, political, regulatory, economic and trade barriers in the design of marketing plans for product development, pricing, channels of distribution; and promotion alternatives in a global market. **PREREQS:** (BA 347 and (BA 390 or BA 309H or BA 590) with a minimum grade of C- or better and graduate standing

MRKT 599. SELECTED TOPICS IN MARKETING

(1-4). Concepts and methods in advanced marketing management practice. Latest theoretical developments and quantitative methods in marketing, with particular relevance to managerial applications. Topics will vary from term to term. This course is repeatable for a maximum of 16 credits. **PREREQS:** Graduate standing.

MRKT 690. MARKETING AND COMMERCIALIZATION (3).

Surveys marketing research related to innovation. Specific topics may change from quarter to quarter, but sample topics include research on marketing strategy, consumer behavior, brand equity, brand management, and product management, each from the perspective of the consumer and the firm. **PREREQS:** Doctoral student status and departmental approval.

The College of Earth, Ocean, and Atmospheric Sciences (CEOAS) has a three-fold mission: to pursue basic and applied research; educate undergraduate and graduate students; and to extend information to society about Earth, oceans and atmosphere, including their interactions and the interrelationships with humans and ecosystems. The college offers undergraduate degrees, graduate degrees, and certificate programs that prepare students for careers in environmental sciences, geography, geology, geophysics, marine resource management, oceanography, atmospheric sciences, geographic information sciences, science education, and related fields. The college prepares students and enables faculty to seek out new ideas and innovative approaches to the complex issues of planetary-scale science.

Please see <http://ceoas.oregonstate.edu/> for more information about the college.

HISTORY

In 2011, the College of Science and the College of Oceanic and Atmospheric Sciences (COAS) committed to a joint enterprise that merged the Department of Geosciences and the Environmental Sciences Undergraduate Program in the College of Science with COAS to form the College of Earth, Ocean, and Atmospheric Sciences (CEOAS). The creation of the College of Earth, Ocean, and Atmospheric Sciences was at the heart of a 10-year process to define a new research and education enterprise organized around the interdisciplinary sciences of the Earth, ocean, and atmosphere. It spans the natural science disciplines and creates strong linkages with the social sciences both within the college as well as around the university.

The college is now Oregon's principal source of expert knowledge about the Earth, ocean and the atmosphere, especially in the Pacific Northwest region, which has long been the focus of major research efforts by OSU researchers. It conducts the only comprehensive oceanographic and atmospheric research programs in Oregon, as well as major programs in geology, geography and geospatial studies. Today, research activities of the college extend throughout the world, and to all oceans. Its advanced-degree graduates hold Earth science, oceanographic, atmospheric research, and marine resource management positions in the United States and many other countries, as well as leadership positions in science and resource management, education, regulatory agencies, and the private sector.

The college educates undergraduate students from across the university in geology, geography, earth systems,

geographic information sciences and environmental sciences. BS degrees are offered in Environmental Sciences and Earth Sciences with options of specialization with hundreds of students enrolled. The college fosters experiential learning through labs and field experience.

FACULTY

Professors Abbott, Barnes, Barth, Bloomer, Brook, Campana, Clark, Colwell, Conway, Davis, de Silva, Dever, Dilles, Egbert, Falkner, Fisk, Freilich, Goldfinger, Goñi, Graham, Grunder, Haggerty, Hales, Harris, Harte, Jones, Kent, Koppers, Kosro, Letelier, Levine, Matano, McManus, Meigs, R. Miller, Mix, Mote, Moum, Nabelek, Nash, Nielsen, Nolin, Prael, Reimers, Samelson, Schultz, Skyllingstad, Smyth, Spinrad, Spitz, Strub, Torres, Trehu, Twohy, Wheatcroft, Wolf
Associate Professors Becker, Benoit-Bird, Carlson, Cianelli, Corcoran, Crump, Gosnell, Grubestic, Haller, Kirby, Kurapov, Lancaster, Lerczak, Özkan-Haller, Ruggiero, Santelmann, Schmittner, Shearman, Shell, Stoner, Tepley, Tuffillaro, Vincent, Vong

Assistant Professors Bernard, de Szoeki, Durland, Fram, Graham, Haley, Hutchings, Jarvis, B. Jenny, Juranek, Kurapov, Lintz, McKay, Schmittner, Shroyer, Thomas, Vardaro, Waldbusser, Wettstein, White

Senior Instructor Cook, K. Yalcin

Instructors L. Becker, Campbell, Hommel, Hyrapiet, Keller, Meyers, Milstein, Narayanaraj, Tilt, Walsh, R. Yalcin

Academic Advisors: Gaid, Hall (Head Advisor), Johnson, Ullman

EMERITI

Allen, Bennett, Byrne, Caldwell, Carey, Chelton (Distinguished) Coakley, Collier, Couch, Cowles, Dalrymple, Dearnorff, de Szoeki, Dillon, Duncan, Esbensen, Frenkel, Gates, Gonor, Good, Gordon (Associate), Holman, Huyer, Jackson, Keller, Kimerling, Klinkhammer, Komar, Kulm, Lawrence, Levi, Lillie, Mahrt, Maresh, Matzke, Miller, Morris, Muckleston, Nelson, Neshyba, Niem, Nolan, Oles, Paulson, Pearcy, Pease, Pillsbury (Associate), Pisas, Rosenfeld, B. Sherr, E. Sherr, Simoneit, Small, Smith, Taubeneck, Taylor, Unsworth, Wheeler (Distinguished), Yeats, Zaneveld

Please see the college website at <http://ceoas.oregonstate.edu> for updated listings that include adjunct faculty, research faculty, courtesy faculty, and research associates.

CEOAS Student Services Office
 104 Wilkinson Hall
 Oregon State University
 Corvallis, OR
 97331-5503
 541-737-1201
 FAX 541-737-1200
 Website: <http://ceoas.oregonstate.edu/>

ADMINISTRATION

Mark R. Abbott,
 Dean

Jack Barth,
 Associate Dean for Research

Anita Grunder,
 Associate Dean for Academic Programs

Flaxen Conway,
 Director of Marine Resource Management Program

Larry Becker,
 Director of the Environmental Sciences Undergraduate Program

Andrew Meigs,
 Director of Geology Program

Julia Jones,
 Director of Geography Program

Robert Wheatcroft,
 Director of Earth Systems Program

Robert Allan,
 Director of Student Development

Kuuiipo Walsh,
 Director, Geographic Information Science Certificate Program

Cori Hall,
 Head Advisor

Undergraduate Majors**Earth Sciences (BS, CRED, HBS)****Options**

Earth Systems
Geography
Geology
Ocean Science

Environmental Sciences (BS, CRED, HBS)**Options**

Applied Ecology and Resource Management
Aquatic Biology
Environmental Chemistry for Environmental Sciences
Environmental Conservation and Sustainability
Environmental Policy
Land-Air Interaction
Pre-Education Environmental Science
Terrestrial Ecosystems
Water Science and Resources

Undergraduate Minors**Environmental Geosciences****Environmental Sciences****Geography****Geology****Oceanography****Undergraduate Certificate****Geographic Information Science****Graduate Majors****Geography (MA, MAIS, MS, PhD)****Graduate Areas of Concentration**

Geographic Information Science
Physical Geography
Resource Geography

Geology (MA, MAIS, MS, PhD)**Graduate Areas of Concentration**

Solid Earth Processes and History
(Volcanology, Igneous Petrology and Economic Geology

•Active tectonics and earthquake geology

Surface Earth Processes and History
(Earth System History, Hydrogeology and Hydrology, Geomorphology and Surface Processes, Climate and Biogeochemical Cycles)

Marine Resource Management (MA, MS)**Graduate Area of Concentration**

Marine Resource Management

Ocean, Earth and Atmospheric Sciences (MA, MAIS, MS, PhD)**Graduate Areas of Concentration**

Atmospheric Sciences
Biological Oceanography
Chemical Oceanography
Geological Oceanography
Geophysics
Physical Oceanography

Graduate Minors**Geography****Geology****Marine Resource Management****Ocean, Earth and Atmospheric Sciences****Water Conflict Management and Transformation****Graduate Certificates****Geographic Information Science****Marine Resource Management****Water Conflict Management and Transformation****REQUIREMENTS FOR UNDERGRADUATE PROGRAMS IN THE COLLEGE:**

The University Baccalaureate Core requirements are explained in a separate section, "Earning a Degree at Oregon State University". The major and option requirements are explained below. If you want to add a minor program or certificate, you will also need to complete the requirements for that minor or certificate. Specific requirements for interdisciplinary minors are listed in the Interdisciplinary Programs section of this catalog.

Academic Advising

Undergraduates within CEOAS are assigned a professional advisor based on major program of study. Advisors help to monitor academic progress through the degree programs, assist students with defining goals within the major, help in navigating university policies and regulations, and provide referrals to campus-wide resources. Faculty within CEOAS are involved as mentors for undergraduates—to guide students on professional and career-related decisions and to help connect students with research opportunities.

Internships and Experiential Learning

CEOAS places a strong emphasis in gaining experience outside of the classroom and offers specialized support to all students for experiential learning opportunities and internships through a designated internship coordinator available to all undergraduates within the college.

Teacher Education

The Earth Sciences and Environmental Sciences majors provide excellent scientific preparation for teaching middle school and high school science. All professional teacher licensure certification occurs in the College of Education.

Double Degrees in Education or International Studies or Sustainability

Undergraduates with majors in CEOAS can earn a second degree in education or international studies or sustainability. See the College of Education or International Programs or Department of Forest

Ecosystems and Society sections of this catalog for more information.

COLLEGE UNDERGRADUATE GRADUATION REQUIREMENTS

Along with fulfilling the university-level, baccalaureate core, and major requirements for BS degrees within CEOAS, students must meet the following college requirements:

- **A grade of at least C- minus is required for all upper-division (300 level and above) courses taken to fulfill major requirements.**
- A minimum 2.00 GPA in major requirement courses (excluding baccalaureate core and electives) is required for all CEOAS majors.
- "S/U" grading is not allowed for courses taken to fulfill major requirements.

REQUIREMENTS FOR ADMISSION TO THE GRADUATE PROGRAMS IN THE COLLEGE:

1. A bachelor's degree with a major (40 quarter credits or more) in a basic natural science (such as physics, mathematics, chemistry, biology, geology, atmospheric science, or computer science) or engineering. Geography and Marine Resource Management applicants must also have a bachelor's degree in the social or political sciences, geography, economics, business administration, fisheries, or engineering.
2. A minimum cumulative grade-point average of 3.00 on a 4.00 scale for the last 90 quarter credits of undergraduate work.
3. A solid foundation in physics, chemistry, and calculus. Qualified applicants deficient in these prerequisites may be admitted conditionally.
4. Graduate Record Examination (GRE) scores (general).
5. Three letters of recommendation.
6. For TOEFL requirements, please see the OSU Admissions Web pages for graduate requirements and contact the CEOAS Student Services Office for specific information.

Early January is the deadline to apply for the following fall term admission. Early application is strongly recommended.

MASTER'S PROGRAMS

All students in College of Earth, Ocean, and Atmospheric Sciences graduate majors must satisfy the minimum program requirements (45 credits including 6 credits of thesis) established by the Graduate School. Some graduate credits earned at other institutions may be approved for inclusion in the program. The Marine Resource Management gradu-

ate program requires additional course work credits. Please contact the Student Services for more information.

A two-hour, final oral examination is required for completion of the master's program (thesis option only).

DOCTOR OF PHILOSOPHY PROGRAM

In graduate programs in the college, the content of PhD programs, other than core requirements, is determined by individual students and their committees. Specific university requirements are formulated by the Graduate School. Approximately 80 credits of courses in the graduate major (including the core courses and 30 to 35 credits of thesis) are usually included in the major. A first and second minor or an integrated minor totaling about 40 credits are common. Graduate credits earned at other institutions may be accepted in the major and minor. The dissertation is based on an original investigation in some area of the graduate major.

Courses taken as a part of the master's program at OSU are normally transferable into the PhD program.

EARTH SCIENCES (BS, CRED, HBS)

The Earth Sciences major program is among the nation's premier undergraduate programs, providing students with a broad range of interests and career aspirations. The program will engage both science and society in critical issues facing the region, the nation, and the international community.

The Earth Sciences major offers four options: Geology, Geography, Earth Systems, and Ocean Science. The Geography and Earth Systems options include tracks designed to train students for career paths in research, education, and human-Earth interactions. The Geology option emphasizes field experiences and hands-on learning in integrated laboratories. Training is suitable in geology, environmental sciences, and science education, among others. The Ocean Science option is suitable for students interested in careers in all aspects of marine science, environmental science, science education, and in advanced graduate studies in a range of subjects.

The Geology option includes the topics covered by the test for the state Geologist Practice Examination conducted by the Board of Geologist Examiners (<http://www.oregon.gov/OSBGE/>).

Required Baccalaureate Core Courses (33)

Earth Sciences Major Requirements (42–43)

ATS 320. *The Changing Climate (3)
CH 231. *General Chemistry (4) *and*
CH 261. *Laboratory for Chemistry 231 (1)
or CH 121. General Chemistry (5)

PH 211. *General Physics with Calculus (4)
or PH 201. *General Physics (5)
GEO 201. *Physical Geology (4)
GEO 202. *Earth Systems Science (4)
GEO 365. Introduction to Geographic Information Systems (4)
GEO 409. Contemporary Earth Science Issues (3)
OC 331. Introduction to Oceanography (3)
MTH 112. *Elementary Functions (4)
MTH 251. *Differential Calculus (4)
ST 351. Introduction to Statistical Methods (4)
or ST 201. Principles of Statistics (4)

EARTH SCIENCES OPTIONS

All students must complete one of four options:

- Earth Systems
- Geography
- Geology
- Ocean Science

Footnote:

* Baccalaureate Core Course

EARTH SYSTEMS OPTION

Requirements

Earth Systems Option: Climate Science

ATS 210. Introduction to the Atmospheric Sciences (3)
ATS 420. Principles of Climate (4)
ATS 421. Climate Modeling (4)
CH 232. *General Chemistry (4)
and CH 262. *Laboratory for Chemistry 232 (1)
or CH 122. *General Chemistry (5)
GEO 295. Introduction to Field Geology (3)
or GEO 296. Introduction to Geographic Field Research (3)
GEO 308. *Global Change and Earth Sciences (3)
GEO 323. ^Climatology (4)
GEO/SOIL 335. *Introduction to Water Science and Policy (3)
GEO 484. Introduction to Biogeochemistry (3)
GEO 486. Quaternary Paleoclimatology (3)
MTH 252. Integral Calculus (4)
PH 212. *General Physics with Calculus (4)
or PH 202. *General Physics (5)

Experiential Learning:

12 credits from the following:
GEO 401. Research (12)
or GEO 403. Thesis (12)
or GEO 410. Internship (12)

Subtotal 55–56

Plus at least 13 credits from the electives below:

ATS 411. Thermodynamics and Cloud Microphysics (4)
ATS 412. Atmospheric Radiation (3)
ATS 413. Atmospheric Chemistry (3)
GEO 306. *Minerals, Energy, Water, and the Environment (3)
GEO 324. Geography of Life: Species Distributions and Conservation (4)
GEO 424. International Water Resources Management (3)
GEO 481. Glacial Geology (4)

GEO 483. Snow Hydrology (3)
GEO 487. Hydrogeology (4)
GEO 488. Quaternary Stratigraphy of North America (3)
MTH 253. Infinite Series and Sequences (4)
MTH 254. Vector Calculus I (4)
MTH 255. Vector Calculus II (4)
MTH 256. Applied Differential Equations (4)
OC 332. Coastal Oceanography (3)
OC 333. Oceans, Coasts, and People (3)
PH 213. *General Physics with Calculus (4)

Total 68–69

GEOGRAPHY OPTION

Requirements (29–30)

ANTH 110. *Introduction to Cultural Anthropology (3)
or PS 204. *Introduction to Comparative Politics (3)
or SOC 204. *Introduction to Sociology (3)
BI 213. Principles of Biology (4)
CS 161. Introduction to Computer Science I (4)
GEO 296. Introduction to Geographic Field Research (3)
GEO 301. Map and Image Interpretation (4)
GEO 323. ^Climatology (4)
or GEO 330. *^Geography of International Development and Globalization (3)
GEO 360. Cartography (4)
ST 202. Principles of Statistics (4)
or ST 352. Introduction to Statistical Methods (4)

Plus 32 credits, including one resource geography, one physical geography, and one GIScience course from the list below:

Physical Geography

GEO 322. Surface Processes (4)
GEO 323. ^Climatology (4)
GEO 324. Geography of Life: Species Distributions and Conservation (4)
GEO 432. Applied Geomorphology (3)
GEO 483. Snow Hydrology (3)
GEO 484. Introduction to Biogeochemistry (3)
GEO 486. Quaternary Paleoclimatology (3)
GEO 487. Hydrogeology (4)

Geography of Resources, Planning, Hazards

GEO 335. *Introduction to Water Science and Policy (3)
GEO 420. Geography of Resource Use (3)
GEO 423. Land Use in the American West (3)
GEO 424. International Water Resources Management (3)
GEO 425. Water Resources Management in the United States (3)
GEO 426. Global Resources and Development (3)
GEO 451. Environmental Site Planning (3)
OC 333. Oceans, Coasts and People (3)

GIScience

FE 208. Forest Surveying (4)
GEO 444. Remote Sensing (4)
GEO 445. Computer-Assisted Cartography (3)
GEO 460. Multimedia Cartography (4)
GEO 465. Geographic Information Systems and Science (4)
GEO 466. Digital Image Processing (3)

GEO 480. Advanced GIS Applications in the Geosciences (**Pending approval #88403**)

Regional Geography/Globalization

GEO 325. *Geography of Africa (3)
 GEO 326. *Geography of Europe (3)
 GEO 327. *Geography of Asia (3)
 GEO 328. *Geography of Latin America (3)
 GEO 329. *Geography of the United States and Canada (3)
 GEO 330. *^Geography of International Development and Globalization (3)
 GEO 350. *Population Geography (3)

Footnotes:

* Baccalaureate Core Course
 ^ Writing Intensive Courses (WIC)

GEOLOGY OPTION

The Geology option is suitable for students interested in careers in applied geology, environmental sciences, science education, and in research. The Geology option includes the topics covered by the test for the state Geologist Practice Examination conducted by the Board of Geologist Examiners (<http://www.oregon.gov/OSBGE/>).

Requirements

CH 232. *General Chemistry (4)
and CH 262. *Laboratory for Chemistry 232 (1)
or CH 122. *General Chemistry (5)
 PH 212. *General Physics with Calculus (4)
or PH 202. *General Physics (5)

In addition, complete a third term of either chemistry or physics:

CH 233. *General Chemistry (4) **and**
 CH 263. *Laboratory for Chemistry 233 (1)
or CH 123. *General Chemistry (5)

OR

PH 213. *General Physics with Calculus (4)
or PH 203. *General Physics (5)
 GEO 203. *Evolution of Planet Earth (4)
 GEO 295. Introduction to Field Geology (3)
 GEO 310. Earth Materials I: Mineralogy (4)
 GEO 315. Earth Materials II: Petrology (4)
 GEO 322. Surface Processes (4)
 GEO 340. Structural Geology (4)
 GEO 370. Stratigraphy and Sedimentology (4)
 GEO 415. Earth Materials III: Igneous Petrography (4)
 GEO 430. Geochemistry (4)
 GEO 463. ^Geophysics and Tectonics (4)
 GEO 487. Hydrogeology (4)
 GEO 495. Advanced Field Geology (6)
 MTH 252. Integral Calculus (4)

Elective Specializations

Choose 9–12 credits from any courses below:

GEO 403. Thesis (3) may count toward the 9–12 credits.

Solid Earth

GEO 412. Igneous Petrology (4)
 GEO 440. Economic Geology (4)
 GEO 497. Field Mapping of Ore Deposits (3)

Earth Surface

GEO 432. Applied Geomorphology (3)
 GEO 481. Glacial Geology (4)
 GEO 483. Snow Hydrology (3)
 GEO 484. Introduction to Biogeochemistry (3)

GEO 486. Quaternary Paleoclimatology (3)
 GEO 488. Quaternary Stratigraphy of North America (3)

SOIL 466. Soil Morphology and Classification (4)

SOIL 468. Soil Landscape Analysis (4)
 Z 427. Paleobiology (3)

Natural Hazards

GEO 427. ^Volcanology (4)
 GEO 433. Coastal Geomorphology (3)
 GEO 461. Geology of Earthquakes (3)

GIScience

GEO 444. Remote Sensing (4)
 GEO 445. Computer-Assisted Cartography (3)
 GEO 460. Multimedia Cartography (4)
 GEO 465. Geographic Information Systems and Science (4)
 GEO 466. Digital Image Processing (3)

Option Total=76–81

OCEAN SCIENCE OPTION

Because of its interdisciplinary scope and quantitative rigor, the Ocean Science option is suitable for students interested in careers in all aspects of marine science, environmental sciences, science education, and in advanced graduate studies in a range of subjects.

CH 232. *General Chemistry (4) **and**
 CH 262. *Laboratory for Chemistry 232 (1)
or CH 122. *General Chemistry (5)
 PH 212. *General Physics with Calculus (4)
and PH 222. Recitation for Physics 212 (1)
or PH 202. *General Physics (5)

In addition, complete a third term of either chemistry or physics:

CH 233. *General Chemistry (4) **and** CH 263. *Laboratory for Chemistry 233 (1)
or CH 123. *General Chemistry (5)

OR

PH 213. *General Physics with Calculus (4)
and PH 223. Recitation for Physics 213 (1)
or PH 203. *General Physics (5)

Plus an additional course in biology; one of the following:

BI 211. *Principles of Biology (4)
 BI 212. *Principles of Biology (4)
 BI 213. *Principles of Biology (4)

An additional college-level mathematics:

MTH 252. Integral Calculus (4)
 MTH 254. Vector Calculus I (4)

GEO 308. *Global Change and Earth Sciences (3)

OC 295. Field Oceanography (3) [**Pending approval**]

OC 332. Coastal Oceanography (3)

OC 333. Oceans, Coasts, and People (3)

OC 334. ^Polar Oceanography (3)

[**Pending approval**]
 OC 430. Principles of Physical Oceanography (4)

OC 440. Introduction to Biological Oceanography (3) [**Pending approval to 4 credits**]

OC 450. Chemical Oceanography (3) [**Pending approval to 4 credits**]

OC 460. Geological Oceanography (3) [**Pending approval to 4 credits**]

Experiential Learning

The program must contain at least 12 credits of experiential learning that may include internship, research or senior thesis. Combinations of these are allowed (e.g., 6 credits of internship and 6 credits of research). Students are urged to work with advisors and the program head at an early stage of their study to plan their experiential learning.

Select one from the following:

OC 401. Research Projects (12)

OC 403. Thesis (12)

OC 410. Internship (12)

Plus two terms (2 credits total) of enrollment in a marine-oriented seminar series:

OC 407. Seminar (1)

Plus at least 12 credits from the electives below:

Students could choose to focus on a specific area or sample from a wide range. Additional MTH courses would be appropriate for some students planning on graduate studies in ocean science.)

Biological

BI 370. Ecology (3)

GEO 484. Introduction to Biogeochemistry (3)

OC 4XX. Global Fisheries (3) [**Pending approval**]

Z 351. Marine Ecology (3)

Z 464. Marine Conservation Biology (3)

Climate

ATS 420. Principles of Climate (4)

ATS 421. Climate Modeling (4)

GEO 323. ^Climatology (4)

GEO 481. Glacial Geology (4)

GEO 486. Quaternary Paleoclimatology (3)

Fluids

CE 311. Fluid Mechanics (4)

CE 412. Hydrology (4)

OC 433. Coastal and Estuarine Oceanography (3)

Geological

GEO 370. Stratigraphy and Sedimentology (4)

GEO 433. Coastal Geomorphology (3)

GEO 463. ^Geophysics and Tectonics (4)

Remote Sensing

GEO 301. Map and Image Interpretation (4)

GEO 360. Cartography (4)

GEO 444. Remote Sensing (4)

Education

HDFS 313. Adolescent Development (4)

SED 407. Seminar: Introduction to Science Education and Outreach (3)

SED 412. Technology Foundations for Teaching Math and Science (3)

SED 413. Inquiry in Science and Science Education (3)

TCE 309. Field Practicum: Science and Math (3)

or TCE 409. Practicum/Clinical Experience (3)

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course

**ENVIRONMENTAL SCIENCES
(BS, CRED, HBS)**

See below for all approved
specialization areas.

Larry C. Becker, *Director*
Environmental Sciences Undergraduate
Program
104 CEOAS Administration Building
Oregon State University
Corvallis, OR 97331
541-737-1201
Email: ensc@oregonstate.edu
Website: [http://ceoas.oregonstate.edu/
envsci/](http://ceoas.oregonstate.edu/envsci/)

Undergraduate Major

Environmental Sciences (BS, CRED, HBS)

Options

*Applied Ecology and Resource
Management (for Ecampus students
only)*

Aquatic Biology

*Environmental Chemistry for the
Environmental Sciences*

*Environmental Conservation and
Sustainability*

Environmental Policy

Land-Air Interaction

Pre-Education Environmental Science

Terrestrial Ecosystems

Water Science and Resources

Minor

Environmental Sciences

Graduate Major

**Environmental Sciences
(MA, MS, PhD, PSM)**

(See the Graduate School.)

An Environmental Sciences degree provides a rigorous education that can lead to helping to understand and resolve some of today's most challenging scientific and policy issues—including global climate change, pollution, biodiversity conservation, sustainability, and balancing resource use and preservation. To help reach these objectives, the Bachelor of Science in Environmental Sciences offers an interdisciplinary approach to environmental problem solving. As an Environmental Sciences major, a student completes course work in four general areas:

1. OSU's general education courses (the baccalaureate core)
2. Basic science and math
3. Environmental sciences and humanities core
4. A specialization area

In addition, each student completes a minimum of 3 credits of experiential learning as an internship, research, study abroad, or field course. The BS degree in Environmental Sciences provides excellent training for a variety of careers—

including work with federal, state, and local agencies, industry, non-profits, and education—or for graduate school. Students can pursue the BS degree either at the Corvallis campus or online through OSU Ecampus.

Major Curriculum

The Environmental Sciences major requires credits in seven categories: 48 credits of baccalaureate core; 51–53 credits of basic science and math; 27–36 credits of environmental sciences and humanities; 27–31 credits of specialization; 3 credits writing intensive course; 3 credits minimum of experiential learning; and 4–53 credits of elective courses (depends on the number of baccalaureate core electives that will also meet requirements in the major).

Baccalaureate Core (48)

The university baccalaureate core course (BCC) requirement is met with 48 credits and a writing intensive course (WIC). The environmental sciences student satisfies the general education requirement by selecting 27 unrestricted credits from the general list of approved courses and 21 credits from a restrictive list of BCC courses, which simultaneously satisfy requirements for the Environmental Sciences major. The WIC and Synthesis requirements are satisfied by courses taken as part of the environmental sciences core curriculum.

Orientation

ENSC 101. Environmental Sciences
Orientation (1)

**Basic Science and Math Courses
(51–53 credits)**

BI 211, BI 212, BI 213. *Principles of
Biology (4,4,4)

CH 121, CH 122, CH 123. General
Chemistry (5,5,5)

or CH 231, CH 232, CH 233. *General
Chemistry (4,4,4) and CH 261, CH 262,
CH 263. *Laboratory for Chemistry 231,
232, 233 (1,1,1)

MTH 251. *Differential Calculus (4)

MTH 268. Mathematical Ideas in Biology
(4)

or MTH 252. Integral Calculus (4)

PH 201, PH 202. *General Physics (5,5)

or PH 211, PH 212. *General Physics with
Calculus (4,4)

ST 351, ST 352. Introduction to Statistical
Methods (4,4)

**Environmental Sciences and
Humanities Core (28–38 credits)****Natural Environmental Systems
(minimum of 12 credits)****One course in atmosphere:**

ATS 210. Introduction to the Atmospheric
Sciences (3)

ATS 420. Principles of Climate (4)

GEO 323. ^Climatology (4)

One course in biosphere:

BI 370. Ecology (3)

One course in hydrosphere:

FE 532. Forest Hydrology (4)

FW 456. Limnology (5)

GEO 335. *Introduction to Water Science
and Policy (3)

GEO 487. Hydrogeology (4)

OC 331. Introduction to Oceanography (3)

One course in lithosphere:

CSS 305. Principles of Soil Science (4) [*CSS
courses offered at EOU LaGrande campus
only.*]

GEO 202. *Earth Systems Science (4)

GEO 221. *Environmental Geology (4)

GEO 352. *Oregon: Geology, Place and
Life on the Ring of Fire (4)

SOIL/CSS 205. *Soil Science (4)

SOIL/CSS 395. *World Soil Resources (3)

**Humans and the Environment
(15–20 credits)****One course in economics, selected
from the following:**

AREC 250. *Introduction to
Environmental Economics and Policy (3)

ECON 201. *Introduction to
Microeconomics (4)

ECON 202. *Introduction to
Macroeconomics (4)

**One course in ethics and
environmental ethics, selected from
the following:**

ANS/FES/FW/SOC 485. *Consensus and
Natural Resources (3)

ANTH 352. *Anthropology, Health, and
Environment (3)

ANTH 481. *Natural Resources and
Community Values (3)

BI/FES/TOX 435. *Genes and Chemicals in
Agriculture: Value and Risk (3)

CH 374. *Technology, Energy, and Risk (3)

ES/PHL 448. Native American Philosophies
(3)

FW 340. *Multicultural Perspectives in
Natural Resources (3)

FW 462. Ecosystem Services (3)

GEO 309. *Environmental Justice (3)

PHL 205. *Ethics (4)

PHL 325. *Scientific Reasoning (4)

PHL 342. Contemporary Ethics (4)

PHL 439. Philosophy of Nature (3)

PHL 440. Environmental Ethics (3)

PHL 443. *World Views and
Environmental Values (3)

PSY 492. Conservation Psychology (4)

SOC 456. *Science and Technology in
Social Context (4)

SOC 480. *Environmental Sociology (4)

SOC 481. *Society and Natural Resources
(4)

**One course in the human
environment, selected from the
following:**

ATS 320. *The Changing Climate (3)

BI 301. *Human Impacts on Ecosystems
(3)

BI 306H. ^*Environmental Ecology (3)

BI/Z 349. *Biodiversity: Causes,
Consequences, and Conservation (3)

CH 390. Environmental Chemistry (3)

ENSC 479. ^*Environmental Case Studies
(3)

FW 325. *Global Crises in Resource
Ecology (3)

FW/HSTS 470. *Ecology and History:
Landscapes of the Columbia Basin (3)

GEO 300. *Sustainability for the Common Good (3)
 GEO 306. *Minerals, Energy, Water, and the Environment (3)
 GEO 308. *Global Change and Earth Sciences (3)
 H 344. Foundations of Environmental Health (3)
 HST 481. *Environmental History of the United States (4)
 SOIL/CSS 395. *World Soil Resources (3)
 Z 348. *Human Ecology (3)

One course in environmental law and policy, selected from the following:

AREC 253. *Environmental Law, Policy, and Economics (4)
 AREC 351. *Natural Resource Economics and Policy (3)
 AREC 352. *Environmental Economics and Policy (3)
 AREC 432. Environmental Law (4)
 AREC 434. ^Measuring Resource and Environmental Impacts (4)
 AREC 454. Rural Development Economics and Policy (3)
 AREC 461. ^Agricultural and Food Policy Issues (4)
 BI/FES/TOX 435. *Genes and Chemicals in Agriculture: Value and Risk (3)
 FOR/FW/RNG 346. Topics in Wildland Fire (3)
 FOR 462. Natural Resource Policy and Law (3)
 FS 492. Ecosystem Services Ecology, Sociology, Policy (3)
 FW 325. *Global Crises in Resource Ecology (3)
 FW 350. *Endangered Species, Society and Sustainability (3)
 FW 415. Fisheries and Wildlife Law and Policy (3)
 FW 462. Ecosystem Services (3)
 GEO 335. *Introduction to Water Science and Policy (3)
 GEO 424. International Water Resources Management (3)
 GEO 425. Water Resources Management in the United States (3)
 GEO 452. Principles and Practices of Rural and Resource Planning (3)
 HST 481. *Environmental History of the United States (4)
 PH 313. *Energy Alternatives (3)
 PS 461. Environmental Political Theory (4)
 PS 475. Environmental Politics and Policy (4)
 PS 476. *Science and Politics (4)
 PS 477. International Environmental Politics and Policy (4)
 SOC 360. *Population Trends and Policy (4)
 WGSS 440. *Women and Natural Resources (3)

One course in environmental management, selected from the following:

ANS/FES/FW/SOC 485. *Consensus and Natural Resources (3)
 BI/Z 349. *Biodiversity: Causes, Consequences, and Conservation (3)
 BOT 415. Forest Insect and Disease Management (5)

CSS 375. Soil Resource Potentials (3)
 FE 434. Forest Watershed Management (4)
 FW 251. Principles of Fish and Wildlife Conservation (3)
 FW 323. Management Principles of Pacific Salmon in the Northwest (3)
 FW 326. Integrated Watershed Management (3)
 FW/BI 421. Aquatic Biological Invasions (4)
 FW 431. Dynamics of Marine Biological Resources (4)
 FW 435. ^Wildlife in Agricultural Ecosystems (3)
 FW/FS 453. Forest Management and Wildlife Conservation (3)
 FW 454. ^Fishery Biology (4)
 FW 458. Mammal Conservation and Management (4)
 FW 464. Marine Conservation Biology (3)
 FW 479. Wetlands and Riparian Ecology (3)
 FOR/FW/RNG 346. Topics in Wildland Fire (3)
 FOR/FW/RNG 446. Wildland Fire Ecology (3)
 FES/HORT 350. Urban Forestry (3)
 FES 352. Wilderness Management (3)
 FES 355. Management for Multiple Resource Values (3)
 FES 365. *Issues in Natural Resources Conservation (3)
 FES 435. *Genes and Chemicals in Agriculture: Value and Risk (3)
 FES 444. Ecological Aspects of Park Management (3)
 FES/HORT 455. Urban Forest Planning, Policy and Management (4) **Ecampus only**
 FES/FW 445. Ecological Restoration (4)
 GEO 306. *Minerals, Energy, Water and the Environment (3)
 GEO 423. Land Use in the American West (3)
 GEO 424. International Water Resources Management (3)
 GEO 425. Water Resources Management in the United States (3)
 GEO 426. Development and Global Resources (3)
 GEO 451. Environmental Site Planning (3)
 HST 481. *Environmental History of the United States (4)
 NR 455. Natural Resource Decision Making (4)
 PH 313. *Energy Alternatives (3)
 RNG 341. Rangeland Ecology and Management (3)
 RNG 355. Desert Watershed Management (3)
 RNG 421. Wildland Restoration and Ecology (4)
 RNG 455. Riparian Ecology and Management (3)
 RNG 490. Rangeland Management Planning (4)
 SOC 480. *Environmental Sociology (4)
 SOC 481. *Society and Natural Resources (4)
 WGSS 440. *Women and Natural Resources (3)

Experiential Learning (3 credits)

The program must contain at least one course, internship, or research experience that provides opportunities for hands-on experience in design and collection of observations in the physical, biological or social environment. Students are urged to work with advisors at an early stage in their study to identify courses or experiences that are appropriate.

Specialization Area (27+ credits)

This requirement can be met by completing an approved certificate, option, or minor from a participating program in the environmental or closely related sciences, or working with advisors to develop an innovative course cluster to analyze environmental systems.

Approved Certificates:

- Certificate of Applied Ethics
- Geographic Information Science

Approved Options:

(All options under the Environmental Sciences major):

- Applied Ecology and Resource Management (for Ecampus students only)
- Aquatic Biology
- Environmental Chemistry for the Environmental Sciences
- Environmental Conservation and Sustainability
- Environmental Policy
- Land-Air Interaction
- Pre-Education Environmental Science
- Terrestrial Ecosystems
- Water Science and Resources

Approved Minors:

- Botany
- Business and Entrepreneurship (Also available via Ecampus)
- Environmental Engineering
- Environmental Geosciences
- Environmental Safety and Health
- Fisheries and Wildlife Sciences (Also available via Ecampus)
- Forestry
- Geography (Also available via Ecampus)
- Horticulture (Also available via Ecampus)
- Natural Resource and Environmental Law and Policy
- Oceanography
- Resource Economics (Also available via Ecampus)
- Soil Science
- Zoology

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

APPLIED ECOLOGY AND RESOURCE MANAGEMENT OPTION**Via Ecampus Only.**

This option was designed for students wishing to complete a BS degree in Environmental Sciences from **off-campus locations**. Many of the courses are Web or video based.

Applied Ecology Core (7)

- BOT 440. Field Methods in Plant Ecology (4)
or RNG 353. Wildland Plant Identification (4)
or FES 341. Forest Ecology (3)
or FES 342. Forest Types of the Northwest (3)
RNG 341. Rangeland Ecology and Management (3)
or RNG 455. Riparian Ecology and Management (3)
FOR 446. Wildland Fire Ecology (3)
FW 479. Wetland Riparian Ecology (3)

**Resource Management Core
Choose any 3 of the following:**

- AREC 351. *Natural Resource Economics and Policy (3)
FES 365. Issues in Natural Resource Conservation (3)
FES 352. Wilderness Management (3)
FES 355. Management for Multiple Resource Values (3)
FES 435. *Genes and Chemicals in Agriculture: Value and Risk (4)
FW 323. Management Principles of Pacific Salmon in the Northwest (3)
FW 435. ^Wildlife in Agricultural Ecosystems (3)
GEO 424. International Water Resources Management (3)
GEO 425. Water Resources Management in the U.S. (3)
HORT/FES 350. Urban Forestry (3)
HORT/FES 455. Urban Forest Planning, Policy and Management (4)
NR 455. Natural Resource Decision Making (3)
RNG 355. Desert Watershed Management (3)
RNG 490. Rangeland Management Planning (4)

The Land and its Interpretation (6–7)**Choose any 2 of the following:**

- FW 303. Survey of Geographic Information Systems in Natural Resources (3)
GEO 301. Map and Image Interpretation (4)
GEO 365. Introduction to Geographic Information Systems (4)
GEO 444. Remote Sensing (4)
GEO 465. Geographic Information Systems and Science (4)

Electives (3–5)**Additional courses above or:**

- FES 493. Environmental Interpretation (4)
FS 439. Human Dimensions in Wildlife (3)
FS 492. Ecosystem Services Ecology, Sociology, Policy (3)
FW 251. Principles of Fish and Wildlife Conservation (3)

- FW 462. Ecosystem Services (3)

Total Credits=27+**AQUATIC BIOLOGY OPTION****Option I—Hatfield Term (27+credits)**

- BI 450. ^Marine Biology (*Taught at Hatfield Marine Science Center*) (16)
Plus 11 credits of electives chosen from the list for Option 2, below, in consultation with ENSC advisor.

Option II**Choose 27 credits or more from below:**

- BI 358. Symbioses and the Environment (3)
BOT 416. Aquatic Botany (4)
FW 315. Ichthyology (3)
FW 316. Systematics of Fishes (2)
FW 421. Aquatic Biological Invasions (4)
FW 431. Dynamics of Marine Biological Resources (4)
FW 454. ^Fishery Biology (4)
FW 456. Limnology (5)
FW 465. Marine Fisheries (4)
FW 473. Fish Ecology (4)
FW 499. Special Topics in Fisheries and Wildlife (4)
OC 440. Introduction to Biological Oceanography (3)
TOX 455. Ecotoxicology: Aquatic Ecosystems (3)
Z 351, Z 352. Marine Ecology and Lab (3,2)
Z 361, Z 362. Invertebrate Biology and Lab (3,2)
Z 477. Aquatic Entomology (4)
Hatfield summer term classes (these vary each year, must be approved by advisor)
Galapagos term abroad classes (these vary each year, must be approved by advisor)

Total Credits=27**ENVIRONMENTAL CHEMISTRY FOR THE ENVIRONMENTAL SCIENCES OPTION**

Environmental chemistry focuses on the basic principles that control the fate of chemicals in the environment. A bewildering variety of chemicals, an inevitable result of modern industrial civilization, are released daily; some of them persist in soil, water, or air. The extent to which these chemicals are a health hazard depends in part on where, how much, and in what form they accumulate. Students will acquire laboratory skills that will be in high demand as worldwide public concern with environmental quality increases.

Substituted Courses

- PH 211, 212. *General Physics with Calculus (4,4)
for PH 201, 202. *General Physics (5,5)

Required Courses

- CH 334, CH 335, CH 336. Organic Chemistry (3,3,3)
CH 390. Environmental Chemistry (3)
CH 440. Physical Chemistry (3)
MTH 254. Vector Calculus I (4)

- PH 213. *General Physics with Calculus (4)

Select two courses from below:

- CH 324. Quantitative Analysis (4)
CH 421. Analytical Chemistry (3)
CH 435. Structural Determination by Spectroscopic Methods (3)
CH 461. Experimental Chemistry II (3)
TOX 430. Chemical Behavior in the Environment (3)
TOX 490. Environmental Forensic Chemistry (3)

Total Credits greater than or = 29 (not including substitute courses)**ENVIRONMENTAL CONSERVATION AND SUSTAINABILITY OPTION**

(**Note:** Most classes are offered through Ecampus; those offered on Corvallis campus only are marked with “cc”)

Core courses (12–13):**Choose at least 1 from:**

- BI/Z 349. *Biodiversity: Causes, Consequences, and Conservation (3)
FES 365. *Issues in Natural Resources Conservation (3)
FW 251. Principles of Fish and Wildlife Conservation (3)

Choose at least 2 from:

- ANTH 481. *Natural Resources and Community Values (3)
AREC 351. *Natural Resource Economics and Policy (3)
AREC 352. *Environmental Economics and Policy (3)
GEO 300. *Sustainability for the Common Good (3)
SOC 480. *Environmental Sociology (4)
SOC 481. *Society and Natural Resources (4)

Choose at least 1 from:

- ATS 320. *The Changing Climate (3)
BI 306H. ^^Environmental Ecology (3)cc
FW 325. *Global Crises in Resource Ecology (3)
GEO 300. *Sustainability for the Common Good (3)

Electives (14–15):

Students must choose at least 5 credits from both the natural science group and the social science group in consultation with an advisor.

Natural Sciences

- ATS 320. *The Changing Climate (3)
BEE 439. Irrigation Principles and Practices (4)
BI 301. *Human Impacts on Ecosystems (3)cc
BI 306. ^^Environmental Ecology (3)cc
BI 311. Genetics (4)
BI/Z 349. *Biodiversity: Causes, Consequences, and Conservation (3)
CH 374. *Technology, Energy, and Risk (3)
CH 390. Environmental Chemistry (3)
CSS 375. Soil Resource Potentials (3)cc
CSS/CROP 499. Special Topics: Genetically Modified Organisms and Sustainable Agriculture (1–16)
CSS/CROP 499. Special Topics: Organic Farming (1–16)
ENGR 350. *Sustainable Engineering (3)cc

FES 352. Wilderness Management (3)
 FES 365. *Issues in Natural Resources Conservation (3)
 FES 435. *Genes and Chemicals in Agriculture: Value and Risk (3)
 FES/FW 445. Ecological Restoration (4)
 FES 493. Environmental Interpretation (4)
 FS 492. Ecosystem Services Ecology, Sociology, Policy (3)
 FW 251. Principles of Fish and Wildlife Conservation (3)
 FW 303. Survey of Geographic Information Systems in Natural Resource (3)
 FW 321. Applied Community and Ecosystem Ecology (3)
 FW 323. Management Principles of Pacific Salmon in the Northwest (3)
 FW 325. *Global Crises in Resource Ecology (3)
 FW 350. *Endangered Species, Society and Sustainability (3)
 FW 435. ^Wildlife in Agricultural Ecosystems (3)
 FW 462. Ecosystem Services (3)
 GEO 300. *Sustainability for the Common Good (3)
 GEO 335. *Introduction to Water Science and Policy (3)
 GEO 365. Introduction to Geographic Information Systems (4)
 HORT 260. Organic Farming and Gardening (3)
 HORT 285. Permaculture Design and Theory: Certification Course (3)
 HORT/FES 350. Urban Forestry (3)
 HORT/FES 455. Urban Forest Planning, Policy and Management (4)
 PH 313. *Energy Alternatives (3)cc
 RNG 341. Rangeland Ecology and Management (3)
Social Sciences
 AG 301. *Ecosystem Science of Pacific NW Indians (3)
 ANTH 481. *Natural Resources and Community Values (3)
 AREC 351. *Natural Resource Economics and Policy (3)
 AREC 352. *Environmental Economics and Policy (3)
 AREC 432. Environmental Law (4)
 FES 493. Environmental Interpretation (4)
 FOR 330. Forest Economics I (4)
 FOR 462. Natural Resource Policy and Law (3)cc
 FS 492. Ecosystem Services Ecology, Sociology, Policy (3)
 FW 340. *Multicultural Perspectives in Natural Resources (3)
 GEO 306. *Minerals, Energy, Water and the Environment (3)
 GEO 309. *Environmental Justice (3)
 GEO 424. International Water Resources Management (3)
 GEO 425. Water Resources Management in the United States (3)
 GEO 452. Principles and Practices of Rural and Resource Planning (3)cc
 HST 469. History of the Pacific Northwest (4)
 HST 481. *Environmental History of the United States (4)
 HSTS/FW 470. *Ecology and History: Landscapes of the Columbia Basin (3)
 PS 449. ^Topics in Comparative Politics (4)cc
 PS 475. Environmental Politics and Policy (4)

PS 476. *Science and Politics (4)
 PS 477. International Environmental Politics and Policy (4)
 SOC 480. *Environmental Sociology (4)
 SOC 481. *Society and Natural Resources (4)
 WGSS 440. *Women and Natural Resources (3)

Total Credits greater than or = 27

Footnotes:

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)
 cc Available on Corvallis campus only.

ENVIRONMENTAL POLICY OPTION

Students should select PHL 440, Environmental Ethics (3), for the environmental ethics and politics requirement and AREC 351, Natural Resource Management and Policy (3), for the conservation and management requirement found in the environmental sciences core curriculum. These are the best choices for core requirements; they do not count toward specialization requirements.

Core Courses (11)

AREC 352. *Environmental Economics and Policy (3)
 HST 481. *Environmental History of the United States (4)
 PS 475. Environmental Politics and Policy (4)

Electives (16)

It is recommended that all courses be selected from the same group.

Agricultural Resources/Economics Group

AREC 351. *Natural Resource Economics and Policy (3)
 AREC 407. Seminar (1)
 AREC 434. ^Measuring Resource and Environmental Impacts (4)
 AREC 454. Rural Development Economics and Policy (3)
 AREC 461. ^Agricultural and Food Policy Issues (4)
 AREC 550. Environmental Economics (3)
 AREC 551. Applications of Environmental and Natural Resource Economics (4)
 ECON 311. Intermediate Microeconomic Theory (4)
 ECON 315. Intermediate Macroeconomic Theory (4)
 ECON 428. ^Introduction to Economic Research (4)
 ECON 435. The Public Economy (4)
 ECON 439. ^Public Policy Analysis (4)
 ECON 455. Economic Development (4)
 FES 435. *Genes and Chemicals in Agriculture: Value and Risk (3)

Forest Resources Group

FES 365. *Issues in Natural Resources Conservation (3)
 FES 435. *Genes and Chemicals in Agriculture: Value and Risk (3)
 FES 444. Ecological Aspects of Park Management (3)
 FES 451. History and Cultural Aspects of Recreation (4)
 FOR 457. Techniques for Forest Resource Analysis (4)

FOR 460. ^Forest Policy (4)
 FOR 462. Natural Resource Policy and Law (3)
 FOR 563. Environmental Policy and Law Interactions (3)

Political Science and Communication Group

AREC 432. Environmental Law (4)
 COMM 426. Intercultural Communication: Theories and Issues (3)
 COMM 440. Theories of Conflict and Conflict Management (3)
 COMM 442. Bargaining and Negotiation Processes (3)
 ECON 439. ^Public Policy Analysis (4)
 PS 321. American Constitutional Law (4)
 PS 331. State and Local Government and Politics (4)
 PS 475. Environmental Politics and Policy (4)
 PS 414. ^Interest Groups (4)
 PS 415. Politics and the Media (4)
 PS 449. ^Topics in Comparative Politics (4)
 PS 461. Environmental Political Theory (4)
 PS 476. *Science and Politics (4)
 PS 477. International Environmental Politics and Policy (4)

Resource Ecology Group

FW 325. Global Crises in Resource Ecology (3)
 FW/SOC 485. *Consensus and Natural Resources (3)
 GEO 300. *Sustainability for the Common Good (3)
 GEO 309. *Environmental Justice (3)
 GEO 335. *Introduction to Water Science and Policy (3)
 GEO 423. Land Use in the American West (3)
 GEO 424. International Water Resources Management (3)
 GEO 425. Water Resource Management in the U.S. (3)
 GEO 426. Third World Resource Development (3)

Sociology Group

SOC 360. *Population Trends and Policy (4)
 SOC 421. Social Change and Modernization (3)
 SOC 466. International Development: Gender Issues (4)
 SOC 480. *Environmental Sociology (4)
 SOC 481. *Society and Natural Resources (4)
 SOC/FW 485. *Consensus and Natural Resources (3)

Total Credits=27

Footnotes:

* Bacc Core Course
 ^ Writing Intensive Course

LAND-AIR INTERACTION OPTION

Basic Science Core Requirement
 PH 211, 212, 213. *General Physics with Calculus (4,4,4)

Core (minimum of 28)

ATS 320. *The Changing Climate (3)
 or GEO 323. ^Climatology (4)
 ATS 413. Atmospheric Chemistry (3)
 or CH 390. Environmental Chemistry (3)
 ATS 420. Principles of Climate (4)
 BOT 331. Plant Physiology (4)
 or BOT 341. Plant Ecology (4)

CSS 305. Principles of Soil Science (4)
[*Taught at EOU LaGrande campus only.*]

or SOIL 205. *Soil Science (4)

CSS 306. Problem Solving: Soil Science Applications (1) [*Taught at EOU LaGrande campus only.*]

FE 430. Watershed Processes (4)

or FE 434. Forest Watershed Management (4)

MTH 254. Vector Calculus I (4)

Total Credits=28 minimum

PRE-EDUCATION ENVIRONMENTAL SCIENCE OPTION

This option prepares students to apply for a graduate teacher licensure program in science and math education.

The core courses for the Environmental Sciences major and for this option, plus electives from the appropriate track below, can complete a student's preparation for a first subject area endorsement in biology or integrated science. The core plus courses listed under the mathematics track below provide partial preparation for a second subject area endorsement in mathematics (to teach at the middle/high school level).

Core Courses (5 credits)

SED 407. Seminar: Introduction to Science Education (2)

SED 406. Projects (3)

or TCE 309. Field Practicum (3)

or TCE 409. Practicum/Clinical

Experience "Winter Break or September Experience" (1–3)

Education Courses (6 credits)

SED 412. Technology Foundations for Teaching Math and Science (3)

SED 413. Inquiry in Science and Science Education (3)

SED 414. Inquiry in Mathematics and Mathematics Education (3)

TCE 216. Purpose, Structure, and Function of Education in a Democracy (3)

TCE 219. Civil Rights and Multicultural Issues in Education (3)

Human Development Course (3–4 credits)

HDFS 313. Adolescent Development (4)

TCE 253. Learning Across the Lifespan (3)

TCE 512. Psychology of the Adolescent (3)

Students should consult with their advisor regarding course selection for the Education and Human Development courses.

Electives selected from one of the endorsement areas listed below:

- **Integrated science first subject area endorsement:** Add the following to the BI, CH and PH courses taken for the Environmental Sciences core, and take GEO 202 for the lithosphere requirement in the Environmental Sciences core:
GEO 201. *Physical Geology (4)
GEO 203. *Evolution of Planet Earth (4)
Select 1–2 additional upper-division course(s) from the

following departments: BB, BI, BOT, CH, GEO, MB or Z

Total credits from core and endorsement area: 27

- **Mathematics Endorsement (for middle-level mathematics teaching; partial preparation)**

MTH 211. *Foundations of Elementary Mathematics (4)

MTH 212. Foundations of Elementary Mathematics (4)

MTH 361. Introduction to Probability (3)

MTH 390. Foundations of Elementary Mathematics (4)

Total credits from core and endorsement area: 29

- **Biology first subject area endorsement:**

BI 311. Genetics (4)

BI 445/BI 545. Evolution (3)

Select 2 additional upper-division courses from the following departments: BB, BI, BOT, HSTS, MB, OC or Z

Total Credits from core and endorsement area: 27

TERRESTRIAL ECOSYSTEMS OPTION

Core Courses (18)

BI 371. ^Ecological Methods (3)

Advanced Ecology (9)

BI 349. *Biodiversity: Causes, Consequences and Conservation (3)

BOT 440. Field Methods in Plant Ecology (4)

BOT 442. Plant Population Ecology (3)

ENT 420. Insect Ecology (3)

FES/FW 445. Ecological Restoration (4)

FW 320. Introductory Population Dynamics (4)

FW 479. Wetland and Riparian Ecology (3)

GEO 324. Geography of Life: Species Distribution and Conservation (4)

RNG 341. Rangeland Ecology and Management (3)

RNG 455. Riparian Ecology and Management (3)

Z 423. Environmental Physiology (4)

Land/Air Processes (6)

ATS 412. Atmospheric Radiation (3)

ATS 413. Atmospheric Chemistry (3)

ATS 420. Principles of Climate (4)

ATS 564. Interactions of Vegetation and Atmosphere (3)

BOT/FS 547. Nutrient Cycling (3)

FE 430. Watershed Processes (4)

or FE 434. Forest Watershed Management (4)

FE 537. Hillslope and Watershed Hydrology (4)

GEO 322. Surface Processes (4)

GEO 323. ^Climatology (4)

GEO 430. Geochemistry (4)

GEO 432. Applied Geomorphology (3)

Principles of Terrestrial Ecosystem Management (9)

Select three courses from one of the following groups for a total of 9 credits.

Courses may be substituted with advisor's written consent.

Forest Group

BOT 415. Forest Insect and Disease Management (5)

FOR 346. Topics in Wildland Fire (3)

FES 435. *Genes and Chemicals in Agriculture: Value and Risk (3)

FES/HORT 350. Urban Forestry (3)

FES/HORT 455. Urban Forest Planning, Policy and Management (4)

FES 493. Environmental Interpretation (4)

FES 444. Ecological Aspects of Park Management (3)

FES/FW 445. Ecological Restoration (4)

FOR 441. Silviculture Principles (4)

FOR 446. Wildland Fire Ecology (3)

FOR 457. Techniques for Forest Resource Analysis (4)

FOR 459. Forest Resource Planning and Decision Making (4)

FS 453. Forest Management and Wildlife Conservation (3)

FS 548. Biology of Invasive Plants (3)

Soils Group

CSS 315. ^Nutrient Management and Cycling (4)[*Taught only at EOU*]

CSS/CROP 330. *World Food Crops (3)

CSS/SOIL 455. Biology of Soil Ecosystems (4)

CSS/SOIL 466. Soil Morphology and Classification (4)

CSS/SOIL 468. Soil Landscape Analysis (4)

CSS/CROP 480. Case Studies in Cropping Systems Management (4)

CSS/SOIL 525. Mineral-Organic Matter Interactions (3)

CSS/SOIL 535. Soil Physics (3)

CSS/SOIL 536. Vadose Zone Hydrology Lab (1)

CSS/SOIL 545. Geochemistry of Soil Ecosystems (4)

GEO 335. *Introduction to Water Science and Policy (3)

Fisheries and Wildlife Group

FW 321. Applied Community and Ecosystem Ecology (3)

FW 446. Wildland Fire Ecology (3)

FW 453/FS 453. Forest Management and Wildlife Conservation (3)

FW 458. Mammal Conservation and Management (4)

FW 462. Ecosystem Services (3)

FW 479. Wetlands and Riparian Ecology (3)

FW 481. Wildlife Ecology (4)

Range Group

RNG 346. Topics in Wildland Fire (3)

RNG 355. Desert Watershed Management (3)

RNG 421. Wildland Restoration and Ecology (4)

RNG 441. Rangeland Analysis (4)

RNG 442. Rangeland-Animal Relations (4)

RNG 446. Wildland Fire Ecology (3)

RNG 455. Riparian Ecology and Management (3)

GIS and Mapping Group

FE 257. GIS and Forest Engineering Applications (3)

FOR 421. Spatial Analysis of Forested Landscapes (3)

GEO 301. Map and Image Interpretation (4)

- GEO 360. Cartography (4)
 GEO 365. Introduction to Geographic Information Systems (4)
 GEO 444. Remote Sensing (4)
 GEO 445. Computer-Assisted Cartography (3)
 GEO 465. Geographic Information Systems and Science (4)
 GEO 466. Digital Imaging Processing (3)

Total Credits=27+

WATER SCIENCE AND RESOURCES OPTION

The Water Science and Resources option focuses on water as a resource and on hydrological sciences. It requires a minimum of 27 credits.

Core Courses (10–12)

GEO 335. *Introduction to Water Science and Policy (3)

Select one hydrological science (4)

- CE 412 Hydrology (4)
 GEO 487. Hydrogeology (4)
 FE 430. Watershed Processes (4)
 or FE 434. Forest Watershed Management (4)

Select one resource ecology/management (3–5)

- FW 456. Limnology (5)
 FW 479. Wetlands and Riparian Ecology (3)
 RNG 355. Desert Watershed Management (3)
 RNG 455. Riparian Ecology and Management (3)

Choose courses from one track listed below (15–17 credits, to bring total to 27 or more)

Water Resources and Policy Track (15–17)

- AREC 351. *Natural Resource Economics and Policy (3)
 FE 535. Water Quality and Land Use (3)
 FW 431. Dynamics of Marine Biological Resources (4)
 FW 464. Marine Conservation Biology (3)
 GEO 306. *Minerals, Energy, Water, and the Environment (3)
 GEO 420. Geography of Resource Use (3)
 GEO 424. International Water Resources Management (3)
 GEO 425. Water Resources Management in the U.S. (3)
 GEO 451. Environmental Site Planning (3)
 GEO 534. Field Geography of Oregon (3)

Hydrological Sciences and Engineering Track (15–17)

Select from courses not used to fulfill the hydrological sciences portion of the core and from the following:

- BEE 439. Irrigation Principles and Practices (4)
 BEE 458. Nonpoint Source Pollution Assessment and Control (3)
 CE 311. Fluid Mechanics (4)
 CE 313. Hydraulic Engineering (4)
 CE 412. Hydrology (4)
 CE 417. Hydraulic Engineering Design (4)
 FE 430. Watershed Processes (4)
 or FE 434. Forest Watershed

- Management (4)
 GEO 322. Surface Processes (4)
 GEO 432. Applied geomorphology (3)
 GEO 487. Hydrogeology (4)

Graduate-level Courses

The following graduate-level courses in hydrological sciences and engineering may be appropriate for strong students. One or more of these may be substituted for courses listed above in this track. Advisor approval is required for such substitution.

- BEE 512. Physical Hydrology (3)
 BEE/CE/GEO 514. Groundwater Hydraulics (3)
 BEE 525. Stochastic Hydrology (3)
 BEE 542. Vadose Zone Transport (4)
 BEE 544. Open Channel Hydraulics (4)
 BEE 546. River Engineering (4)
 CE 543. Applied Hydrology (4)
 CSS/SOIL 535. Soil Physics (3)
 FE 535. Water Quality and Forest Land Use (3)
 GEO 582. Geomorphology of Forests and Streams (3)

Total Credits=27

Footnotes:

- * Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

INTERNATIONAL STUDIES (BA, HBA)

See International Programs for information on the International Studies Degree.

SUSTAINABILITY (BS, HBS)

The Sustainability Double Degree includes core, practicum and individualized study components. Courses from a student's major course of study will not count towards double-degree requirements. Completion of the double degree will require 36 credits beyond the 180-credit minimum for graduation.

OSU Main Campus Contact:

Kate Lajtha, 3059 Ag Life Sciences Building, Oregon State University, Corvallis, OR 97331; 541-737-5674; kate.lajtha@oregonstate.edu or Fox Peterson, Lead Advisor, fox.peterson@oregonstate.edu

OSU-Cascades Campus Contact:

Matt Shinderman, Forest Ecosystems and Society, Oregon State University Cascades; 541-322-3159; matt.shinderman@osucascades.edu.

Sustainability Core (17)

- NR 350. *Sustainable Communities (4)
 SUS 304. *Sustainability Assessment (4)
 SUS 420. Social Dimensions of Sustainability (3)
 SUS 430. Ecological Dimensions of Sustainability (3)[**Pending submission & approval of a proposal**]
 or BI 301. *Human Impacts on Ecosystems (3)
 or BI 306H. *^Environmental Ecology (3)
 SUS 440. Economic Dimensions of Sustainability (3)[**Pending submission & approval of a proposal**]

- or AREC 352/ECON 352. *Environmental Economics and Policy (3)
 or AREC 434. ^Measuring Resource and Environmental Impacts (4)

Practicum (3)

- SUS 410. Sustainability Internship (3)
 or SUS 499. Sustainable Workshop/Service Learning (3)

Note: SUS 410. Credits may be achieved by participation in an IE3 Global Internship with advisor approval.

Remaining Credits (16)

In addition to the 20 credits specified above, students must work with the sustainability program advisor to select courses relevant to their discipline and career path interests (16 credits total).

Credit total=36

Classes that can be used to fulfill remaining requirements are listed below. Students are NOT limited to taking courses within their primary major of study. The sustainability advisor(s) will approve courses not listed here if they have an obvious link to sustainability and fulfill the intent of the double degree. See the OSU Sustainability Office list of sustainability-related courses.

Business

- AREC 250. *Introduction to Environmental Economics and Policy (3)
 AREC 351. *Natural Resource Economics and Policy (3)
 AREC 352. *Environmental Economics and Policy (3)
 AREC 434. ^Measuring Resource and Environmental Impacts (4)
 BA 302. Business Process Management (4)
 BA 351. Managing Organizations (4)
 BA 352. Managing Individual and Team Performance (4)
 BA 362. Social Entrepreneurship and Social Initiatives (4)
 BA 465. *Systems Thinking and Practice (4)
 BA 466. Integrative Strategic Experience (4)
 ECON 202. *Macroeconomics (4)
 ECON 311. Intermediate Microeconomic Theory (4)
 MGMT 452. Leadership (4)

Engineering

- BEE 221. Fundamentals of Ecological Engineering (3)
 BEE 320. Biosystem Analysis and Modeling (3)
 BEE 322. Ecological Engineering Thermodynamics and Transfer Process (4)
 CCE 422. Green Building Materials (3)
 CHE 450. Conventional and Alternative Energy Systems (3)
 CHE 451. Solar Energy Technologies (3)
 ECE 438. Electric and Hybrid Vehicles (4)
 ENGR 350. *Sustainable Engineering (3)
 ENVE 321. Environmental Engineering Fundamentals (4)
 ME 312. Thermodynamics (4)

Natural Sciences

- ATS 320. *The Changing Climate (3)
 BI 301. *Human Impacts on Ecosystems (3)
 BI 306. *^Environmental Ecology (3)
 BI 349/Z 349. *Biodiversity: Causes,

Consequences and Conservation (3)
 BI 370. Ecology (3)
 BI 435. *Genes and Chemicals in Agriculture: Value and Risk (3)
 CH 374. *Technology, Energy, and Risk (3)
 CH 390. Environmental Chemistry (3)
 FES 341. Forest Ecology (3)
 FES 355. Management for Multiple Resource Values (3)
 FES 360. Collaboration and Conflict Management (3)
 FES 365. *Issues in Natural Resources Conservation (3) *Ecampus only*
 FES/FW 445. Ecological Restoration (4)
 FES 455. Urban Forest Planning, Policy and Management (4) *Ecampus only*
 FOR 462. Natural Resource Policy and Law (3)
 FW 251. Principles of Fish and Wildlife Conservation (3)
 FW 303. Survey of Geography Information Systems in Natural Resources (3)
 FW 321. Applied Community and Ecosystem Ecology (3)
 FW 325. *Global Crises in Resource Ecology (3)
 FW 326. Integrated Watershed Management (3)
 FW 340. *Multicultural Perspectives in Natural Resources (3)
 FW 350. *Endangered Species, Society, and Sustainability (3)
 FW 435. ^Wildlife an Agricultural Ecosystems (3)
 FW 485. *Consensus and Natural Resources (3)
 FW 488. Problem Solving in Fisheries and Wildlife Science (3)
 FW 489. Effective Communications in Fisheries and Wildlife Science (3)
 GEO 300. *Sustainability for the Common Good (3)
 GEO 306. *Minerals, Energy, Water, and the Environment (3)
 GEO 309. *Environmental Justice (3)
 GEO 324. Geography of Life: Species Distributions and Conservation (4)
 GEO 330. ^Geography of International Development and Globalization (3)
 GEO 350. *Population Geography (3)
 GEO 365. Introduction to Geographic Information Systems (4)
 GEO 420. Geography of Resource Use (3)
 GEO 423. Land Use in the American West (3)
 GEO 424. International Water Resources Management (3)
 GEO 426. Third-World Resource Development (3)
 GEO 451. Environmental Site Planning (3)
 GEO 452. Principles and Practices of Rural and Resource Planning (3)
 GEO 453. Resource Evaluation Methods/ EIS (3)
 PH 313. *Energy Alternatives (3)
 SOIL/GEO 335. *Introduction to Water Science and Policy (3)
 SOIL 475. Soil Resource Potentials (3)
 SOIL 499. ST/Gene Modified Organisms and Sustainable Agriculture (1–16)
 SOIL 499. ST/Organic Farming (1-16) or HORT 260. Organic Farming and Gardening (3)
 Z 348. *Human Ecology (3)

Z 349/BI 349. *Biodiversity: Causes, Consequences, and Conservation (3)

Social Sciences/Humanities

ANTH 481. *Natural Resources and Community Values (3)
 AREC 250. *Introduction to Environmental Economics and Policy (3)
 AREC 253. *Environmental Law, Policy, and Economics (4)
 AREC 351. *Natural Resource Economics and Policy (3)
 AREC 352. *Environmental Economics and Policy (3)
 AREC 434. ^Measuring Resource and Environmental Impacts (4)
 COMM 408. Workshop (3)
 COMM 440. Theories of Conflict and Conflict Management (3)
 COMM 442. Bargaining and Negotiation Processes (3)
 ENG 482. Studies in American Literature, Culture and the Environment (4)
 PHL 325. *Scientific Reasoning (4)
 PHL 390. Moral Theories (3)
 PHL 439. Philosophy of Nature (3)
 PHL 440. Environmental Ethics (3)
 PHL 443. *World Views and Environmental Values (3)
 PS 331. State and Local Government and Politics (4)
 PS 370. *Science, Religion, and Politics (4)
 PS 449. ^Topics in Comparative Politics (4)
 PS 461. Environmental Political Theory (4)
 PS 475. Environmental Politics and Policy (4)
 PS 477. International Environmental Politics and Policy (4)
 SOC 360. *Population Trends and Policy (4)
 SOC 480. *Environmental Sociology (4)
 SOC 481. *Society and Natural Resources (4)
 SOC 485. *Consensus and Natural Resources (3)

Footnotes:

* Bacc Core Course
 ^ Writing Intensive Course (WIC)

ENVIRONMENTAL GEOSCIENCES MINOR

Required core courses (16–20 credits)

Earth Science (8)

GEO 101. *The Solid Earth (4)
 or GEO 201. *Physical Geology (4)
 GEO 102. *The Surface of the Earth (4)
 or GEO 202. *Earth Systems Science (4)
 or GEO 221. *Environmental Geology (4)

Geosciences (11)

GEO 301. Map and Image Interpretation (4)
 GEO 322. Surface Processes (4)
 GEO 409. Contemporary Earth Science Issues (3)

And 8–12 credits of advanced courses, all in one of four tracks:

Track A. Humans, Resources and Planning

GEO 306. *Minerals, Energy, Water and the Environment (3)
 GEO 307. Geology of National Parks (3)
 GEO 309. *Environmental Justice (3)
 GEO 335. *Introduction to Water Science and Policy (3)

GEO 350. *Population Geography (3)
 GEO 420. Geography of Resource Use (3)
 GEO 423. Land Use in the American West (3)
 GEO 424. International Water Resources Management (3)
 GEO 425. Water Resources Management in the U.S. (3)
 GEO 426. Third-World Resource Development (3)
 GEO 440. Economic Geology (4)
 GEO 452. Principles and Practices of Rural and Resource Planning (3)
 GEO 453. Resource Evaluation Methods/ EIS (3)

Track B. Surface Processes and Climate

GEO 308. *Global Change and Earth Sciences (3)
 GEO 323. ^Climatology (4)
 GEO 324. Geography of Life: Species Distribution and Conservation (4)
 GEO 370. Stratigraphy and Sedimentology (4)
 GEO 431. Applied Climatology (3)
 GEO 432. Applied Geomorphology (3)
 GEO 439. Topics in Physical Geography (3)
 GEO 451. Environmental Site Planning (3)
 GEO 481. Glacial Geology (4)
 GEO 582. Geomorphology of Forests and Streams (3)

Track C. Geology and Geologic Hazards

GEO 306. *Minerals, Energy, Water and the Environment (3)
 GEO 310. Earth Materials I: Mineralogy (4)
 GEO 315. Earth Materials II: Petrology (4)
 GEO 340. Structural Geology (4)
 GEO 427. Volcanology (4)
 GEO 430. Geochemistry (4)
 GEO 451. Environmental Site Planning (3)
 GEO 458. Plate Tectonics of Continental Collision (3)
 GEO 461. Geology of Earthquakes (3)
 GEO 463. Geophysics and Tectonics (4)

Track D. Water

CE 412. Hydrology (3)
 FE 430. Watershed Processes (4)
 GEO 306. *Minerals, Energy, Water and the Environment (3)
 GEO 335. *Introduction to Water Science and Policy (3)
 GEO 424. International Water Resources Management (3)
 GEO 425. Water Resources Management in the U.S. (3)
 GEO 430. Geochemistry (4)
 GEO 451. Environmental Site Planning (3)
 GEO 487. Hydrogeology (4)

Total=43–51

ENVIRONMENTAL SCIENCES MINOR

Also available via Ecampus.

Course substitutions must be selected in consultation with an environmental sciences advisor. Substitutions must cover material in the same course category (natural environmental systems or humans and the environment) at a similar

or higher level. Credits must sum to a minimum of 27.

Core: Natural Environmental Systems (12–14)

ATS 210. Introduction to the Atmospheric Sciences (3)

or ATS 420. Principles of Climate (4)

or GEO 323. ^Climatology (4)

BI 370. Ecology (3)

GEO 202. *Earth Systems Science (4)

or GEO 221. *Environmental Geology (4)

or GEO 352. *Oregon: Geology, Place and Life on the Ring of Fire (4)

or CSS 305. Principles of Soil Science (4) [Offered at EOU LaGrande campus only.]

or CSS 395. *World Soil Resources (3)

[Offered at EOU LaGrande campus only.]

or SOIL 205. *Soil Science (4)

or SOIL 395. *World Soil Resources (3)

OC 331. Introduction to Oceanography (3)

or GEO 335. *Introduction to Water Science and Policy (3)

or FE 532. Forest Hydrology (4)

or FW 456. Limnology (5)

or GEO 487. Hydrogeology (4)

Humans and the Environment (15–19)

Select at least one course in each of the following five categories to bring the total number of credits to 27 or more.

One course in economics, selected from the following:

AREC 250. *Introduction to Environmental Economics and Policy (3)

ECON 201. *Introduction to Microeconomics (4)

One course in environmental law and policy, selected from the following:

AREC 253. *Environmental Law, Policy, and Economics (4)

AREC 351. *Natural Resource Economics and Policy (3)

AREC 352. *Environmental Economics and Policy (3)

AREC 353. Public Land Statutes and Policy (4)

AREC 432. Environmental Law (4)

AREC 434. ^Measuring Resource and Environmental Impacts (4)

AREC 453. Public Land and Resource Law (4)

AREC 454. Rural Development Economics and Policy (3)

AREC 461. ^Agricultural and Food Policy Issues (4)

FOR/RNG/FW 346. Topics in Wildland Fire (3)

FOR 462. Natural Resource Policy and Law (3)

FES/BI/TOX 435. *Genes and Chemicals in Agriculture: Value and Risk (4)

FS 492. Ecosystem Services Ecology, Sociology, Policy (3)

FW 325. *Global Crises in Resource Ecology (3)

FW 350. *Endangered Species, Society and Sustainability (3)

FW 415. Fisheries and Wildlife Law and Policy (3)

FW 462. Ecosystem Services (3)

GEO 335. *Introduction to Water Science and Policy (3)

GEO 424. International Water Resources Management (3)

GEO 425. Water Resources Management in the United States (3)

GEO 452. Principles and Practices of Rural and Resource Planning (3)

HST 481. *Environmental History of the United States (4)

PH 313. *Energy Alternatives (3)

PS 461. Environmental Political Theory (4)

PS 475. Environmental Politics and Policy (4)

PS 476. *Science and Politics (4)

PS 477. International Environmental Politics and Policy (4)

SOC 360. *Population Trends and Policy (4)

WGSS/WS 440. *Women and Natural Resources (3)

One course in ethics and environmental ethics, selected from the following:

ANTH 481. *Natural Resources and Community Values (3)

CH 374. *Technology, Energy and Risk (3)

FW 340. *Multicultural Perspectives in Natural Resources (3)

FW 462. Ecosystem Services (3)

FES/BI/TOX 435. *Genes and Chemicals in Agriculture: Value and Risk (4)

GEO 309. *Environmental Justice (3)

PHL 205. *Ethics (4)

PHL 325. *Scientific Reasoning (4)

PHL 342. Contemporary Ethics (4)

PHL 439. Philosophy of Nature (3)

PHL 440. Environmental Ethics (3)

PHL 443. *World Views and Environmental Values (3)

PHL/ES 448. Native American Philosophies (3)

SOC 456. *Science and Technology in Social Context (4)

SOC 480. *Environmental Sociology (4)

SOC 481. *Society and Natural Resources (4)

SOC/FW/ANS 485. *Consensus and Natural Resources (3)

One course in the human environment, selected from the following:

ATS 320. *The Changing Climate (3)

BI 301. *Human Impacts on Ecosystems (3)

BI 306. *^Environmental Ecology (3)

or BI 306H. *^Environmental Ecology (3)

CH 390. Environmental Chemistry (3)

ENSC 479. *^Environmental Case Studies (3)

FW 325. *Global Crises in Resource Ecology (3)

GEO 300. *Sustainability for the Common Good (3)

GEO 306. *Minerals, Energy, Water, and the Environment (3)

GEO 308. *Global Change and Earth Sciences (3)

H 344. Foundations of Environmental Health (3)

HST 481. *Environmental History of the United States (4)

HSTS/FW 470. *Ecology and History: Landscapes of the Columbia Basin (3)

SOIL 395. *World Soil Resources (3)

or CSS 395. *World Soil Resources (3)

[Offered at EOU LaGrande campus only.]

Z 348. *Human Ecology (3)

Z/BI 349. *Biodiversity: Causes, Consequences, and Conservation (3)

One course in environmental management, selected from the following:

BOT 415. Forest Insect and Disease Management (5)

CSS 375. Soil Resource Potentials (3)

[Offered at EOU LaGrande campus only.]

FE 434. Forest Watershed Management (4)

FES 352. Wilderness Management (3)

FES 355. Management for Multiple Resource Values (3)

FES 365. *Issues in Natural Resources Conservation (3)

FES 444. Ecological Aspects of Park Management (3)

FES/FW 445. Ecological Restoration (4)

FOR/RNG/FW 346. Topics in Wildland Fire (3)

FOR/FW/RNG 446. Wildland Fire Ecology (3)

FES/BI/TOX 435. *Genes and Chemicals in Agriculture: Value and Risk (3)

FW 251. Principles of Fish and Wildlife Conservation (3)

FW 323. Management Principles of Pacific Salmon in the Northwest (3)

FW 326. Integrated Watershed Management (3)

FW/BI 421. Aquatic Biological Invasions (4)

FW 431. Dynamics of Marine Biological Resources (4)

FW 435. ^Wildlife in Agricultural Ecosystems (3)

FW/FS 453. Forest Management and Wildlife Conservation (3)

FW 454. ^Fishery Biology (4)

FW 458. Mammal Conservation and Management (4)

FW 464. Marine Conservation Biology (3)

FW 479. Wetlands and Riparian Ecology (3)

GEO 306. *Minerals, Energy, Water and the Environment (3)

GEO 423. Land Use in the American West (3)

GEO 424. International Water Resources Management (3)

GEO 425. Water Resources Management in the United States (3)

GEO 426. Third-World Resource Development (3)

GEO 451. Environmental Site Planning (3)

HORT/FES 350. Urban Forestry (3)

HORT/FES 455. Urban Forest Planning, Policy and Management (4)

HST 481. *Environmental History of the United States (4)

NR 455. Natural Resource Decision Making (4)

PH 313. *Energy Alternatives (3)

RNG 341. Rangeland Ecology and Management (3)

RNG 355. Desert Watershed Management (3)

RNG 421. Wildland Restoration and Ecology (4)
 RNG 455. Riparian Ecology and Management (3)
 RNG 490. Rangeland Management Planning (4)
 SOC 480. *Environmental Sociology (4)
 SOC 481. *Society and Natural Resources (4)
 SOC/FW/ANS 485. *Consensus and Natural Resources (3)
 WGSS 440. *Women and Natural Resources (3)
 Z/BI 349. *Biodiversity: Causes, Consequences, and Conservation (3)

Total Credits=Minimum of 27**GEOGRAPHY MINOR****Also available via Ecampus.**

The Geography minor will allow interested non-majors to explore:

- how the Earth works,
- the people who live on its surface,
- the value of accessing and properly using geographic information, and
- how to bring concepts of relative location, pattern and spatial process to bear on key societal questions.

The minor consists of 14 credits of core courses and at least 13 credits of elective courses for a total of 27 credits.

Core Requirements (14)

One course in each of the following areas:

World Regional Geography (choose one)

GEO 105. *Geography of the Non-Western World (3) *EC*
 or GEO 106. *Geography of the Western World (3) *EC*

Physical Geography (choose one)

GEO 101. *The Solid Earth (4) *EC*
 GEO 102. *The Surface of the Earth (4) *EC*
 GEO 201. *Physical Geology (4)
 GEO 202. *Earth Systems Science (4)
 GEO 203. *Evolution of Planet Earth (4)
 GEO 221. *Environmental Geology (4) *EC*
 OC 103. *Exploring the Deep: Physical Geography of the World's Oceans (4) *EC*

Sustainability

GEO 300. *Sustainability for the Common Good (3) *EC*

Geographic Techniques

GEO 301. Map and Image Interpretation (4) *EC*

Electives (13)

Select any combination of additional courses from the list below totaling at least 13 credits. Courses are grouped below by focus area; students may choose courses from one or more focus areas.

Regional Geography:

GEO 105. *Geography of the Non-Western World (3) *EC*
 or GEO 106. *Geography of the Western World (3) *EC* (whichever was not taken as part of the core requirements above)
 GEO 307. *National Park Geology and Preservation (3) *EC*
 GEO 325. *Geography of Africa (3)

GEO 326. *Geography of Europe (3) *EC*
 GEO 327. *Geography of Asia (3) *EC*
 GEO 328. *Geography of Latin America (3)
 GEO 329. *Geography of U.S. and Canada (3) *EC*

Earth Processes and Hazards:

GEO 305. *Living with Active Cascade Volcanoes (3) *EC*
 GEO 308. *Global Change and Earth Sciences (3) *EC*
 GEO 323. ^Climatology (4) *EC*
 GEO 380. *Earthquakes in the Pacific Northwest (3) *EC*

Resource Development:

GEO 306. *Minerals, Energy, Water, and the Environment (3) *EC*
 GEO 309. *Environmental Justice (3) *EC*
 GEO 330. *^Geography of International Development and Globalization (3)
 GEO 350. *Population Geography (3) *EC*
 GEO 420. Geography of Resource Use (3)
 GEO 423. Land Use in the American West (3) *EC*
 GEO 426. Third-World Resource Development (3)

Water Policy and Management:

GEO 335. *Introduction to Water Science and Policy (3) *EC*
 GEO 424. International Waters Resources Management (3) *EC*
 GEO 425. Water Resources Management in the United States (3) *EC*
 GEO 487. Hydrogeology (4) *EC*

Total = 27**Footnotes:**

* Baccalaureate Core Course
 EC Also available via Extended Campus

GEOLOGY MINOR

The undergraduate Geology minor provides a means for students majoring in physics, chemistry, civil engineering, forest engineering, and related fields to develop a strong geology background as part of their program.

Required

GEO 201. *Physical Geology (4)
 or GEO 101. *The Solid Earth (4)
 GEO 202. *Earth Systems Science (4)
 or GEO 102. *The Surface of the Earth (4)
 GEO 203. *Evolution of Planet Earth (4)
 GEO 301. Map and Image Interpretation (4)
 GEO 310. Earth Materials I: Mineralogy (4)
 GEO 315. Earth Materials II: Petrology (4)

Plus one geology course from below:

GEO 322. Surface Processes (4)
 GEO 340. Structural Geology (4)
 GEO 370. Stratigraphy and Sedimentology (4)
 GEO 412. Igneous Petrology (4)
 GEO 415. Earth Materials III: Igneous Petrography (4)
 GEO 427. ^Volcanology (4)
 GEO 430. Geochemistry (4)
 GEO 432. Applied Geomorphology (3)
 GEO 463. ^Geophysics and Tectonics (4)
 GEO 481. Glacial Geology (4)
 GEO 487. Hydrogeology (4)
 GEO 488. Quaternary Stratigraphy of North America (3)

The following courses are recommended for students interested in advanced geology degrees:

GEO 295. Introduction to Field Geology (3)
 GEO 340. Structural Geology (4)

Total=27–28**OCEANOGRAPHY MINOR**

Undergraduates interested in the marine sciences can complete an Oceanography minor by following the curriculum below. This minor will add interdisciplinary breadth to undergraduate programs, broaden employment prospects, and enhance chances for gaining admission to graduate programs.

The undergraduate Oceanography minor is suggested for students in any of the major programs of the College of Science, in fisheries and wildlife or in engineering. The minor also provides a broad environmental sciences background for students planning to become high school teachers of earth or life sciences. The Oceanography minor is administered under the dean by the College of Earth, Ocean, and Atmospheric Sciences' Student Services Office.

Required (18–19)

OC 331/OC 331H. Introduction to Oceanography (3)
 OC 332/OC 332H. Coastal Oceanography (3)[Prereq: OC 331]
 OC 430. Principles of Physical Oceanography (4)
 or OC 433. Coastal and Estuarine Oceanography (3)
 OC 440. Introduction to Biological Oceanography (3)
 OC 450. Chemical Oceanography (3)
 OC 460. Geological Oceanography (3)

Research and Internships (3)

OC 401. Research Project (1–4)
 or OC 405. Reading and Conference (1–4)
 or OC 499. Special Topics in Oceanography (1–4)

Electives (6–8)**Choose two from the following:**

Additional course in oceanography (3)¹
 Additional course in marine resource management (3)¹
 Z 351. Marine Ecology (3)
 FW 431. Dynamics of Marine Biological Resources (4)
 Other approved course (3)¹

Total=27**Footnotes:**

¹ Oceanography and MRM courses should be discussed with Oceanography minor advisors Drs. Ted Strub, tstrub@coas.oregonstate.edu, and Rob Wheatcroft raw@coas.oregonstate.edu. Drs. Strub or Wheatcroft need to approve courses outside OC and MRM. Questions can also be addressed to the CEOAS Associate Dean Dr. Anita Grunder, grundera@science.oregonstate.edu.

[^] Writing Intensive Course (WIC)

GEOGRAPHY (MA, MS, PhD, MAIS)**Graduate Areas of Concentration**
Geographic information science, physical geography, resource geography

Geography is the study of human use and interaction with the Earth and the identification of spatial and temporal variation in natural and human processes. Geography uses principles of mathematics, social science, and natural science to analyze and interpret change in the environment. Many geographic studies require a combination of field, laboratory and computational work. Geography plays an important role in urban and land use planning, resource evaluation, environmental analysis, education and cartography.

Majors in geography develop a background in regional geography, resource geography, geographic information science, and physical geography and in statistics and disciplines related to geography like geology, forestry, and anthropology. Course offerings combined with excellent facilities and supportive electives allow students to develop particular interests such as resource management, environmental analysis, land use planning and cartography/geographic information systems/remote sensing.

The program has an applied orientation, placing emphasis on the application of geographic information science to environmental and resource utilization and problem solution. Master's degree candidates may elect a thesis or nonthesis option. Geography participates as one of the minors in Master of Arts in Interdisciplinary Studies degree programs. No foreign language is required for the MS degree. One foreign language is required for the MA and PhD degrees.

Contact Stacey Schulte, 541-737-1221, stacey.schulte@oregonstate.edu, for additional information.

GEOLOGY (MA, MS, PhD, MAIS)**Graduate Areas of Concentration**
Solid Earth processes and history (volcanology, igneous petrology, economic geology); surface Earth processes and history (Earth system history, hydrogeology and hydrology, geomorphology and surface processes, climate and biogeochemical cycles)

Geology is the study of the materials, processes, and history of the solid Earth and its fluid envelopes. Geology is an integrative field, drawing on mathematics, chemistry, physics and biology to understand the interactions of the lithosphere, biosphere, atmosphere and hydrosphere. Studies in geology commonly combine observations and measurements from field, laboratory, and computational studies. Geology plays an important role in decisions about resource use, slope stability and the safety of build-

ing projects, natural hazards standards, mineral exploration and extraction, the basic workings of the Earth, and the understanding of the effects and rates of natural and human-induced change in the environment.

Most graduate research in the geology program includes field study. An approved field course of at least 9 quarter credits or equivalent experience is prerequisite to candidacy for a graduate degree. No foreign language is required.

Contact Stacey Schulte, 541-737-1221, stacey.schulte@oregonstate.edu, for additional information.

Students who seek training in a combination of field and laboratory techniques applying a variety of scientific problems will find very few places with the number of opportunities or the variety of facilities that are available at Oregon State. Research in the department falls under three broad areas: Solid Earth Processes and History; Surface Earth Processes and History; and Human Interaction with the Earth.

Programs of study in the Geology graduate major lead to the Master of Science or Master of Arts and Doctor of Philosophy degrees

Master of Science (MS) and Master of Arts (MA) Degrees:

The master's degree requires successful completion of at least 45 credits of appropriate courses including a thesis. The thesis presents a written summary of research findings and conclusions. All master's programs include a final oral examination. Each graduate program is supervised by a committee of at least three members of the graduate faculty who collaborate with the student in developing a program of study and research leading to the final oral examination. The examination is conducted and approved by the student's graduate committee.

The MA degree requires a foreign language proficiency equivalent to that attained at the end of a second year university course in that language with a grade of C (2.00) or better.

Doctor of Philosophy (PhD) Degree:

The doctor of philosophy (PhD) degree is granted for proven ability in research and mastery of an area within the discipline of geology. This is demonstrated through successful performance in at least 108 credits of appropriate course work and research. Pursuit of the PhD also requires passing qualifying exams that advance a student to candidacy. The doctoral program includes original research in a major topic in one of the department's areas of specialization submitted as a dissertation that is presented and defended orally. A committee of at least four members of the graduate faculty assist the major professor in supervising and examining the PhD student. PhD candi-

dates must complete at least three of four consecutive terms with at least 36 credits taken on the OSU campus.

Graduate Minor

Advanced degree programs in geology may include an optional minor subject area. It may be in a single discipline or an integrated grouping of courses organized around a theme. In developing minors, students commonly combine courses from several campus departments.

MARINE RESOURCE MANAGEMENT (MA, MS)**Graduate Areas of Concentration**
Marine resource management

Marine Resource Management (MRM) is a science-based, interdisciplinary master's program based in College of Earth, Ocean, and Atmospheric Sciences (CEOAS). The program provides students with the interdisciplinary training necessary to function confidently and effectively in professional resource management positions. Marine and coastal issues are technically and politically complex, involving many interests, perspectives and stakeholders. To deal effectively with these issues, marine resource managers need a broad-based background in both physical and social sciences. Graduates from the program are trained to bridge the gap between science and policy.

The program offers two tracks, professional and a thesis:

Professional track students develop a project and defend a report on that work, based on either an internship or a research project.

Thesis track students are expected to produce a more extensive and rigorous piece of original work and analysis, and must meet additional requirements set by the Graduate School and advisor. Applicants must meet the general admission requirements of the college.

More than 40 faculty from CEOAS, other university departments and outside institutions participate in MRM. These partnerships include departments of Fisheries and Wildlife, Applied Economics, and Anthropology; the School of Public Policy; Sea Grant Extension specialists; and scientists and management professionals from state and federal agencies. The program consists of required courses in oceanography, atmospheric science, and marine law. Typical elective courses include resource economics, fisheries science, political science, anthropology, sociology, and communications. Each program of study is adjusted to the needs of the individual. Applicants must meet the general admission requirements of the college.

Contact Flaxen Conway, 541-737-1339, fconway@coas.oregonstate.edu, for more information.

OCEAN, EARTH AND ATMOSPHERIC SCIENCES (MA, MS, PhD, MAIS)

Graduate Areas of Concentration

Atmospheric sciences, biological oceanography, chemical oceanography, geological oceanography, geophysics, physical oceanography

Ocean, Earth and Atmospheric Sciences (OEAS) is an interdisciplinary graduate major that first introduces students to the elements of the Earth system and the processes of mass and energy flow among them through a set of core/breadth courses:

- OEAS 500. Cascadia Field Trip (3)
- OEAS 520. The Solid Earth (4)
- OEAS 530. The Fluid Earth (4)
- OEAS 540. The Biogeochemical Earth (4)

Students then pursue focused graduate course work and research in the following concentration areas, directed by their program committee.

OEAS Concentration Areas Atmospheric Sciences

The atmospheric sciences are concerned with dynamics, physics and processes, including the interactions of the atmosphere with soil physics, hydrology and oceanic circulation. The atmospheric sciences concentration in the College of Earth, Ocean, and Atmospheric Sciences prepares students for careers in teaching and research through advanced study and participation in research projects directed by faculty members. MA, MS and PhD degrees are offered.

Applicants should have an undergraduate degree in physics, mathematics, engineering, chemistry or atmospheric science, with strength in mathematics. All applicants should have completed one year each of chemistry and physics with calculus, and courses in vector calculus and in differential equations.

Students perform thesis research on a wide range of problems including the study of global climate change, clouds and the earth's radiation budget, the structure and dynamics of turbulent flows, air-sea interaction, planetary atmospheres, the optimal use and economic value of weather and climate forecasts, and the study of acid rain and its effects on terrestrial ecosystems. In addition to theoretical, numerical, and observational methods of analysis, approximately one-fourth of the research projects either use or are developing methods for obtaining meteorological information from satellites.

Opportunities exist for PhD candidates to conduct some of their thesis research in Europe or at the National Center for Atmospheric Research. Most research projects involve collaboration with other scientists, either on the Oregon State University campus or at major domestic or international research centers.

Geophysics

Geophysics is concerned with physical processes within and on Earth, especially the internal physical constitution of the planet, and seismic, gravitational, geothermal, geoelectrical, geomagnetic phenomena and their relation to geological processes. The geophysics concentration offers graduate work toward MA, MS and PhD degrees. Candidates should have an undergraduate degree in physics, mathematics, engineering, geology, or geophysics. Mathematics through differential equations is required and mathematical physics is desirable. Graduate Record Exam scores are required of all applicants. Opportunities for research exist on a wide range of geophysical problems in marine and continental regimes, emphasizing experimental, applied, and theoretical aspects.

Oceanography

Oceanography, the application of the sciences to the study of the oceans, is an interdisciplinary environmental science concerned with all processes: biological, chemical, geological, and physical, as well as the interactions between the ocean. The College of Earth, Ocean, and Atmospheric Sciences graduate major offers MA, MS and PhD degrees with a concentration in oceanography.

For all areas in oceanography, applicants should have a strong quantitative background and an undergraduate degree in a relevant field of science or engineering and one year each of chemistry, physics, and calculus. Prior background in oceanography is not essential.

In geological oceanography (marine geology), a broad range of geological processes that influence the ocean is studied. Fields of interest include plate tectonics and the structure of the ocean basins, igneous petrology and geochemistry, paleoceanography and paleoclimatology, and coastal sedimentary processes. Candidates show strength in one or more of these fields: earth science, chemistry, physics, biology or mathematics.

Physical oceanography research covers the physical processes in the sea, exchange of energy and momentum at the air-sea interface, and the transmission and absorption of energy in the sea (e.g., light, heat, and sound). Circulation, tides, waves, heat content, and density distributions are some of the other phenomena of particular interest. Candidates should have an undergraduate major in physics, mathematics, or engineering.

Contact Robert Allan, 541-737-1340, rallan@coas.oregonstate.edu, for more information.

GEOGRAPHY GRADUATE MINOR

Contact Stacey Schulte, 541-737-1221, stacey.schulte@oregonstate.edu, for additional information.

GEOLOGY GRADUATE MINOR

Contact Stacey Schulte, 541-737-1221, stacey.schulte@oregonstate.edu, for additional information.

MARINE RESOURCE MANAGEMENT GRADUATE MINOR

Contact Robert Allan, 541-737-1340, rallan@coas.oregonstate.edu, for more information.

OCEAN, EARTH AND ATMOSPHERIC SCIENCES GRADUATE MINOR

Contact Robert Allan, 541-737-1340, rallan@coas.oregonstate.edu, for more information.

WATER CONFLICT MANAGEMENT AND TRANSFORMATION GRADUATE MINOR

Graduate Areas of Concentration *Water conflict management and transformation*

The graduate minor in Water Conflict Management and Transformation is designed to accommodate the needs of professionals and graduate students. It offers an integrative approach that explicitly integrates human and policy dimensions of water resources within the framework of scientific and technological solutions. The graduate minor is a flexible, coherent program that offers critical and underemphasized skills essential to preventing and resolving water conflicts. It helps facilitate dialogue on critical water issues across diverse values and perspectives, and it serves OSU students, citizens and officials in Oregon, the United States and internationally.

The curriculum centers around case-based, interactive course and field work to provide an in-depth look at water conflict, conflict transformation, and prevention issues and strategies across four distinct and overlapping themes: water governance, water and ecosystems, water and society, and water and economics. Each theme incorporates several topics critical to understanding water conflicts. A highlight of the minor is the capstone course coupled with an intersession practicum working with watershed councils, landowners, and agencies in Northeast Oregon; and a guided and critiqued project in which two teams take on, for example, the roles of Jordan and Israel to negotiate a treaty for water resource allocation in a simulated water negotiation. These techniques will hone student skills, understanding and thought development. Students will also take part in fieldwork in a watershed or basin at risk of, or in, water conflict.

Through this minor, students will learn about and practice conflict transformation skills, explore what new insti-

tutional networks and relationships are needed, and how these can be achieved through role-playing, in-class exercises, and guest lectures. Students will also be introduced to leadership skills for guiding this type of change.

Contact Lynette deSilva, 541-737-7013, desilval@geo.oregonstate.edu, for additional information.

All students seeking a graduate minor are subject to all general policies governing the courses for the master's degree. As such, these students will be required to take a minimum of 50 percent graduate stand-alone courses. The remaining credits may be the 500-component of 400/500 slash courses.

Required Courses (6 credits)

Capstone Courses

(Select a minimum of 3 credits)

COMM 442/COMM 542. Bargaining and Negotiation Processes (3)
COMM 446/COMM 546. Communication in International Conflict and Disputes (3)
WRP 521. Water Governance and Conflict Management (3)

Practicum/Internship

(Select a minimum of 3 credits)

WRP 509. Practicum (3)
WRP 510. Internship (3)

Elective Courses (Minimum 12 credits)

Water Governance

(Select a minimum of 3 credits)

AREC 432/AREC 532. Environmental Law (4)
AREC 599. Special Topics (Law and Policy) (4)
COMM 440/COMM 540. Theories of Conflict and Conflict Management (3)
FOR 462/FOR 562. Natural Resource Policy and Law (3)
FOR 463/FOR 563. Environmental Policy and Law Interactions (3)
GEO 424/GEO 524. International Water Resources Management (3)
GEO 425/GEO 525. Water Resource Management in the U.S. (3)
PS 454/GEO 554. International Law and Organizations (4)
PS 475/PS 575. Environmental Politics and Policy (4)
PS 577. International Environmental Politics and Policy (4)
WRP 599. Special Topics (*Seminar: Oregon Water Law and Policy*) (3)

Water and Society

(Select a minimum of 3 credits)

ANTH 477/ANTH 577. Ecological Anthropology (4)
ANTH 481/ANTH 581. Natural Resources and Community Values (4)
CE 548. Water Quality Dynamics (3)
ENVE 456/ENVE 556. Sustainable Water Resources Development (3)
ENVE 531. Fate and Transport of Chemicals in Environmental Systems (4)
ENVE 532. Aqueous Environmental Chemistry (4)
ENVE 554. Groundwater Remediation (4)
FE 535. Water Quality and Forest Land Use (3)

GEO 420/GEO 520. Geography of Resource Use (3)
H 427/H 527. Case Studies in International Health (3)
H 429/H 529. International Health (3)
H 512. Introduction to Environmental and Occupational Health Sciences (3)
H 514. Environment, Safety and Health Seminar (1)
H 528. Global Health Issues (3)
H 540. Water and Human Health (3)
H 541. Air Quality and Human Health (3)
MRM 515. Coastal Resources Management (4)
PHL 440/PHL 540. Environmental Ethics (3)
PHL 443/PHL 543. World View and Environmental Values (3)
PS 577. International Environmental Politics and Policy (4)
SOC 481/SOC 581. Society and Natural Resources (3-4)
SOC 580. Society and Natural Resources (4)
SOC 585. Consensus and Natural Resources (4)
WRP 599. Special Topics (*Seminar: Socio-technical Aspects of Water Resources*) (3)

Water and Ecosystems

(Select a minimum of 3 credits)

BEE 458/BEE 558. Nonpoint Source Pollution Assessment and Control (3)
BEE 512. Physical Hydrology (3)
FE 430/530. Watershed Processes (4)
FE 532. Forest Hydrology (3)
FE 537. Hillslope and Watershed Hydrology (4)
FE 538. Field Hydrology (3)
FW 426/FW 526. Coastal Ecology and Resource Management (5)
FW 479/FW 579. Wetlands and Riparian Ecology (3)
GEO 582. Geomorphology of Forests and Streams (3)
GEO 583. Snow Hydrology (3)

Water and Economics

(Select a minimum of 3 credits)

AREC 505. Reading and Conference (3) or AREC 507. Seminar (3)
AREC 534. Environmental and Resource Economics (3)
AREC 543. International Trade (4)
AREC 550. Environmental Economics (3)
AREC 551. Applications of Environmental and Natural Resource Economics (4)

Total=18 credits (Minimum)

GEOGRAPHIC INFORMATION SCIENCE CERTIFICATE

Kuipo Walsh, Director

GIScience Certificate Program
134 Wilkinson Hall
College of Earth, Ocean, and Atmospheric Sciences
Oregon State University
Corvallis, OR 97331
541-737-3795
FAX 541-737-1200
Email: kuipo.walsh@oregonstate.edu
Website: <http://ceoas.oregonstate.edu/giscience>

Oregon State University offers an un-

dergraduate and graduate certificate in Geographic Information Science. Geographic information science (GIScience) includes the existing technologies and research areas of geographic information systems (GIS), cartography, remote sensing, photogrammetry, and surveying (also termed geomatics in the U.S.). GIScience therefore addresses fundamental issues surrounding the use of digital technology to handle geographic information; namely, information about places, activities, and phenomena on and near the surface of the Earth that are stored in maps or images. GIScience includes questions of data structures, analysis, accuracy, meaning, cognition, visualization, and many more, and thus overlaps with the domains of many traditional disciplines (e.g., Earth science, mathematics, computer science, physics, cognitive science, and ethics). However, GIScience is not central to any of these, representing instead a new kind of scientific collaboration that is defined by researchers from many distinct backgrounds working together on particular sets of interrelated problems. The use of GIScience technologies (including, but definitely not limited to GIS) has become pervasive throughout the scientific community, natural resource management, government, industry, and business. Even small advancements in geographic information science are having broad effects in improving day-to-day tasks throughout all sectors of society.

Background Courses

MTH 112. Elementary Functions (4)
or Equivalent high school or university course
ST 201, ST 202. Principles of Statistics (4,4)
or ST 351, ST 352. Introduction to Statistical Methods (4,4)
or ST 314. Introduction to Statistics for Engineers (3)
or ECE 353. Introduction to Probability and Random Signals (3)

Required Core (19-20 credits)

FE 208. Forest Surveying (4)
GEO 301. Map and Image Interpretation (4)
GEO 360. Cartography (4)
GEO 365. Introduction to Geographic Information Systems (4)
or FE 257. GIS and Forest Engineering Applications (3)
or CE 202. Civil Engineering: Geospatial Information and GIS (3)
GEO 444. Remote Sensing (4)

Electives (7-8)

Elective courses may be in one of four tracks: cartography, GIS, remote sensing, geomatics. See advisor.

CE 413. GIS in Water Resources (3)
CSS/SOIL 468. Soil Landscape Analysis (4)
ECE 468. Digital Image Processing (3)
FE 209. Forest Photogrammetry and Remote Sensing (4)
FE 310. Forest Route Surveying (4)

FE 422. Forest Geomatics (4)
 FOR 421. Spatial Analysis of Forested Landscapes (3)
 FW 303. Survey of Geographic Information Systems in Natural Resources (3)
 GEO 410. Internship (1–5)
 GEO 445. Computer-Assisted Cartography (3)
 GEO 460. Multimedia Cartography (4)
 GEO 465. Geographic Information Systems and Science (4)
 GEO 466. Digital Image Processing (3)
 HORT 414. Information Systems in Agriculture (4)

GEOGRAPHIC INFORMATION SCIENCE GRADUATE CERTIFICATE

Kuuipo Walsh, *Director*

GIScience Certificate Program
 134 Wilkinson Hall
 College of Earth, Ocean, and Atmospheric Sciences
 Oregon State University
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 541-737-3795
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 Website: <http://ceos.oregonstate.edu/giscience/>

Oregon State University offers an undergraduate and graduate certificate in Geographic Information Science. Geographic information science (GIScience) includes the existing technologies and research areas of geographic information systems (GIS), cartography, remote sensing, photogrammetry, and surveying (also termed geomatics in the U.S.). GIScience therefore addresses fundamental issues surrounding the use of digital technology to handle geographic information; namely, information about places, activities, and phenomena on and near the surface of the Earth that are stored in maps or images. GIScience includes questions of data structures, analysis, accuracy, meaning, cognition, visualization, and many more, and thus overlaps with the domains of many traditional disciplines (e.g., Earth science, mathematics, computer science, physics, cognitive science, and ethics). However, GIScience is not central to any of these, representing instead a new kind of scientific collaboration that is defined by researchers from many distinct backgrounds working together on particular sets of interrelated problems. The use of GIScience technologies (including, but definitely not limited to GIS) has become pervasive throughout the scientific community, natural resource management, government, industry, and business. Even small advancements in geographic information science are having broad effects in improving day-to-day tasks throughout all sectors of society.

Background Courses

GEO 360. Cartography (4)
 MTH 112. Elementary Functions (4)
 ST 201, ST 202. Principles of Statistics (4,4) or ST 351, ST 352. Introduction to Statistical Methods (4,4) or ST 511, ST 512. Methods of Data Analysis (4,4)
 or ECE 353. Introduction to Probability and Random Signals (3)

Required Core (7 credits)

GEO 544. Remote Sensing (4)
 GEO 565. Geographic Information Systems and Science (3)

Electives (10–11)

CE 513. GIS in Water Resources (3)
 CS 549. Selected Topics in Information-Based Systems (1–5)
 CSS/SOIL 568. Soil Landscape Analysis (4)
 FOR 510. Internship (3 or more credits, *advisor approval*) or GEO 510. Internship (3 or more credits, *advisor approval*)
 FOR 521. Spatial Analysis of Forested Landscapes (3)
 GEO 541. Spatio-Temporal Variation in Ecology and Earth Science (4)
 GEO 545. Computer-Assisted Cartography (3)
 GEO 560. Multimedia Cartography (4)
 GEO 566. Digital Image Processing (3)
 GEO 580. Advanced GIS Applications in the Geosciences (4)
 HORT 514. Information Systems in Agriculture (4)
 OC 678. Ocean Remote Sensing (4)
 RNG 550. Landscape Ecology and Analysis (3)
 ST 565. Time Series (3)

WATER CONFLICT MANAGEMENT AND TRANSFORMATION GRADUATE CERTIFICATE

Lynette de Silva, *Director*

Program in Water Conflict Management and Transformation
 Oregon State University
 College of Earth, Ocean, and Atmospheric Sciences
 256 Wilkinson Hall
 Corvallis, OR 97331
 Phone: 541-737-7013
 Fax: 541-737-1200
 Email: desilval@geo.oregonstate.edu
 Web: <http://www.transboundarywaters.orst.edu/>

The graduate certificate in Water Conflict Management and Transformation is an 18-credit interdisciplinary program. It is designed to provide graduate students, non-degree students, water professionals and decision-makers with the required specialized resources and skills to address the water demands and challenges of the 21st Century, in Oregon, across the United States and internationally.

The curriculum centers around case-based, interactive course and field work to provide an in-depth look at water conflict, conflict transformation, and prevention issues and strategies across four

distinct and overlapping themes:

- Water Governance
- Water and Ecosystems
- Water and Society
- Water and Economics

Each theme incorporates several topics critical to understanding water conflicts.

The curriculum for the graduate certificate in Water Conflict Management and Transformation is as follows:

Capstone Course Work (3 credits required)

COMM 442/COMM 542. Bargaining and Negotiation Processes (3)
 COMM 446/COMM 546. Communication in International Conflict and Disputes (3)
 WRP 599. Special Topic: Water Governance and Conflict Management (3)

Capstone Practicum/Internship (3 credits required)

WRP 509. Practicum (3)
 WRP 510. Internship (3)

Water Governance (3 credits required)

AREC 432/AREC 532. Environmental Law (4)
 COMM 440/COMM 540. Theories of Conflict and Conflict Management (3)
 FOR 462/FOR 562. Natural Resource Policy and Law (3)
 FOR 463/FOR 563. Environmental Policy and Law Interactions (3)
 GEO 424/GEO 524. International Water Resources Management (3)
 GEO 425/GEO 525. Water Resources Management in the U.S. (3)
 PS 454/PS 554. International Law and Organizations (4)
 PS 475/PS 575. Environmental Politics and Policy (4)
 PS 577. International Environmental Politics and Policy (4)

Water and Society (3 credits required)

ANTH 477/ANTH 577. Ecological Anthropology (4)
 ANTH 481/ANTH 581. Natural Resources and Community Values (3)
 CE 548. Water Quality Dynamics (3)
 ENVE 456/ENVE 556. Sustainable Water Resources Development (3)
 ENVE 531. Fate and Transport of Chemicals in Environmental Systems (4)
 ENVE 532. Aquatic Chemistry: Natural and Engineered Systems (4)
 ENVE 554. Groundwater Remediation (4)
 FE 535 Water Quality and Forest Land Use (3)
 GEO 420/GEO 520. Geography of Resource Use (3)
 H 427/H 527. Case Studies in International Health (3)
 H 429/H 529. International Health (3)
 H 512. Introduction to Environmental and Occupational Health Sciences (3)
 H 514. Environment, Safety and Health Seminar (1)
 H 528. Global Health Issues (3)
 H 540. Water and Human Health I (3)
 H 541. Air Quality and Human Health (3)
 PHL 440/PHL 540 Environmental Ethics (3)
 PHL 443/PHL 543. World Views and Environmental Values (3)

- PS 577. International Environmental Politics and Policy (4)
 SOC 481/SOC 581. Society and Natural Resources (4)
 SOC 580. Environmental Sociology (4)
 SOC 585. Consensus and Natural Resources (3)

Water and Ecosystems (3 credits required)

- BEE 458/BEE 558. Nonpoint Source Pollution Assessment and Control (3)
 BEE 512. Physical Hydrology (3)
 FE 430/FE 530. Watershed Processes (4)
 FE 532. Forest Hydrology (4)
 FE 537. Hillslope and Watershed Hydrology (4)
 FE 538. Field Hydrology (3)
 FW 426/FW 526. Coastal Ecology and Resource Management (5)
 FW 479/FW 579. Wetlands and Riparian Ecology (3)
 GEO 582. Geomorphology of Forests and Streams (3)
 GEO 583. Snow Hydrology (3)

Water and Economics (3 credits required)

- AREC 505. Reading and Conference (3)
 or AREC 507. Seminar (3)
 AREC 534. Environmental and Resource Economics (3)
 AREC 543. International Trade (4)
 AREC 550. Environmental Economics (3)
 AREC 551. Applications of Environmental and Natural Resource Economics (4)

Total=18

Advisor guidance and approval is required for each student's certificate program of study. All students seeking a graduate certificate are subject to all general policies governing the courses for the master's degree. As such, these students will be required to take a minimum of 50% graduate stand-alone courses. The remaining credits may be the 500 component of 400/500 slash courses.

Non-degree students, and those requiring additional information and advising should contact Lynette de Silva at desilval@geo.oregonstate.edu.

MARINE RESOURCE MANAGEMENT GRADUATE CERTIFICATE

The management of our marine resources encompass both biophysical and human dimensions. Marine management professionals need to understand these dimensions, utilizing both physical and social sciences to tackle challenging issues, and effectively communicate best management practices to scientists, decision makers, and stakeholders.

The Marine Resource Management graduate certificate offers a blend of science- and management-oriented courses that prepare participants (professionals, decision-makers, and graduate students) to become leaders in marine resource management.

Certificate Overview and Requirements:

- Completion of core courses in marine policy and law,
- Two courses from the human dimensions area, and
- Two courses from ocean and coastal science area.

Course Examples:

- Ocean Law
- Rights-Based Fisheries Management
- Ecological Policy
- Physical Oceanography
- Marine Pollution

Current graduate students must notify the Marine Resource Management program of their intention to pursue this certificate. Upon consultation with MRM faculty, they will be given instructions regarding listing courses on their programs of study and obtaining the required signature for that form.

Professionals and other students must notify the Marine Resources Management program of their intention to pursue this certificate.

Contact Robert Allan, 541-737-1340, rallan@coas.oregonstate.edu, for more information.

Required Courses

- MRM 520. Coastal Law (3)
 or MRM 521. Ocean Law (3)
 MRM 530. Principles and Practice of Marine Resource Management (3)

Human Dimensions Subject Area Select 2 courses for at least 6 credits from below:

- ANTH 581. Natural Resources and Community Values (4)
 AREC 534. Environmental and Resource Economics (3)
 COMM 540. Theories of Conflict and Conflict Management (3)
 COMM 542. Bargaining and Negotiation Processes (3)
 COMM 544. Third Parties in Dispute Resolution: Mediation/Arbitration (3)
 FW 520. Ecology and Management of Marine Fishes (3)
 FW 564. Marine Conservation Biology (3)
 FW 620. Ecological Policy (3)
 MRM 535. Rights-Based Fisheries Management (3)
 PS 575. Environmental Politics and Policy (4)
 PS 577. International Environmental Politics and Policy (4)
 SOC 580. Environmental Sociology (4)
 SOC 581. Society and Natural Resources (4)

Ocean and Atmospheric Systems Science Subject Area

Select 2 courses for at least 6 credits from below:

- ATS 520. Principles of Climate (4)
 FW 531. Dynamics of Marine Biological Resources (4)
 OC 533. Coastal and Estuarine Oceanography (3)
 OC 654. Marine Pollution (3)
 OEAS 520. The Solid Earth (4)

- OEAS 530. The Fluid Earth (4)
 OEAS 540. The Biogeochemical Earth (4)

Total=18 credits

Other courses may be substituted upon approval of the certificate director.

Note: The Marine Resource Management graduate certificate is not eligible for federal financial aid if it is not part of a master's degree-seeking program. The certificate is not eligible if taken as a stand-alone program. The MRM graduate certificate is eligible for federal financial aid if it is part of a master's degree-seeking program.

■ ATMOSPHERIC SCIENCES COURSES

ATS 210. INTRODUCTION TO THE ATMOSPHERIC SCIENCES (3). Physical basis of atmospheric phenomena on small, medium and large scales; introduction to atmospheric dynamics and thermodynamics; examination of atmospheric circulation systems; introduction to atmospheric physics and chemistry. Offered every term. **PREREQS:** College algebra and elementary functions.

ATS 210H. INTRODUCTION TO THE ATMOSPHERIC SCIENCES (3). Physical basis of atmospheric phenomena on small, medium and large scales; introduction to atmospheric dynamics and thermodynamics; examination of atmospheric circulation systems; introduction to atmospheric physics and chemistry. Offered every term. **PREREQS:** College algebra and elementary functions. Honors College approval required.

ATS 320. *THE CHANGING CLIMATE (3). Survey of Earth's climate and the factors that influence climate. Examine causes of changes in atmospheric composition, the expected consequences of these changes, problems predicting future changes, and what can be done about the changes. Offered annually in fall. (Bacc Core Course)

ATS 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ATS 399H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

ATS 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

ATS 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits.

ATS 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

ATS 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

ATS 407. SEMINAR (1). One-credit sections. Graded P/N. This course is repeatable for a maximum of 99 credits.

ATS 411. THERMODYNAMICS AND CLOUD MICROPHYSICS (4). Thermodynamic processes in the atmosphere, and an introduction to cloud microphysics. Offered annually. **PREREQS:** ((MTH 254 or MTH 254H) and PH 213)

ATS 412. ATMOSPHERIC RADIATION (3). Radiative transfer in the earth and planetary atmospheres, absorption and scattering of sunlight, absorption and emission of terrestrial radiation, absorption and scattering cross sections for molecules, cloud droplets and aerosols. Applications include enhancement of photochemical reaction rates in clouds, remote sensing, and the earth's radiation budget, radiative-convective equilibrium, radiative forcing due to changes in atmospheric composition and climate change. **PREREQS:** ((MTH 254 or MTH 254H) and (MTH 256 or MTH 256H) and PH 213)

ATS 413. ATMOSPHERIC CHEMISTRY (3). Principles of atmospheric chemistry; chemical fundamentals, sampling principles, sources, reactions, scavenging, and deposition of sulfur, nitrogen, ozone, and carbon compounds. Atmospheric aerosol size distribution, mechanics, optics, and scavenging. Offered annually. **PREREQS:** (CH 121 or CH 201 or CH 221 or CH 224) and (MTH 251 or MTH 241)

ATS 420. PRINCIPLES OF CLIMATE (4). Physics of climate past, present and future. Covers radiative processes, thermodynamics, cloud physics, and dynamics affecting the earth's climate. Paleoclimate record and mechanisms driving this variability will be presented, along with modes of climate variability and various climate models. **PREREQS:** One year of college physics and college calculus.

ATS 421. CLIMATE MODELING (4). Numerical models of the physics, chemistry, biology, and geology of the climate system. A range of climate models from a simple, single equation to complex state-of-the-science systems used for future projections. Theoretical concepts will be linked to practical applications through hands-on programming exercises and data analysis. Lec/lab. **PREREQS:** ATS 420/ATS 520 (recommended, talk to instructor if not taken); no prior programming knowledge required.

ATS 475. PLANETARY ATMOSPHERES (3). Origin and evolution of planetary atmospheres; vertical structure of atmospheres; hazes and clouds; atmospheric motions and general circulation. Presentation of recent observations and current research issues, focusing on Venus, Earth, Mars, Jupiter, Saturn, and Titan. Emphasis on comparative aspects and simple models. **PREREQS:** ((MTH 254 or MTH 254H) and PH 213)

ATS 499. SELECTED TOPICS (1-16). This course is repeatable for a maximum of 99 credits.

ATS 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

ATS 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

ATS 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

ATS 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

ATS 507. SEMINAR (1). One-credit sections. Graded P/N. This course is repeatable for a maximum of 99 credits.

ATS 511. THERMODYNAMICS AND CLOUD MICROPHYSICS (4). Thermodynamic processes in the atmosphere, and an introduction to cloud microphysics. Offered annually. **PREREQS:** MTH 254 and PH 213

ATS 512. ATMOSPHERIC RADIATION (3). Radiative transfer in the earth and planetary atmospheres, absorption and scattering of sunlight, radiation, absorption and emission of terrestrial absorption and scattering cross sections for molecules, cloud droplets and aerosols. Applications include enhancement of photochemical reaction rates in clouds, remote sensing, and the earth's radiation budget, radiative-convective equilibrium, radiative forcing due to changes in atmospheric composition and climate change. **PREREQS:** MTH 254 and MTH 256 and PH 213

ATS 513. ATMOSPHERIC CHEMISTRY (3). Principles of atmospheric chemistry; chemical fundamentals, sampling principles, sources, reactions, scavenging, and deposition of sulfur, nitrogen, ozone, and carbon compounds. Atmospheric aerosol size distribution, mechanics, optics, and scavenging. Offered annually. **PREREQS:** (CH 121 or CH 201 or CH 221 or CH 224) and (MTH 251 or MTH 241)

ATS 515. ATMOSPHERIC DYNAMICS I (4). Derivation of equations governing atmospheric motions; shallow atmosphere approximation and the primitive equations. Simple balanced flows; vertical motion, circulation, vorticity and potential vorticity; Ekman layer dynamics; prototypical atmospheric waves; geostrophic adjustment; quasi-geostrophic motions; analysis of structure of synoptic-scale systems; baroclinic instability. Offered alternate years. **PREREQS:** MTH 256 and PH 213

ATS 516. ATMOSPHERIC DYNAMICS II (4). Review of basic equations; scale analysis and approximations. Turbulence and boundary layers. Dry and moist convection; convective storms. Frontogenesis; symmetric instability; internal gravity waves and mountain waves; differentially heated circulations including sea breezes. Slope flows and urban circulations. Offered alternate years. **PREREQS:** ATS 515 and/or equivalent.

ATS 520. PRINCIPLES OF CLIMATE (4). Physics of climate past, present and future. Covers radiative processes, thermodynamics, cloud physics, and dynamics affecting the earth's climate. Paleoclimate record and mechanisms driving this variability will be presented, along with modes of climate variability and various climate models. **PREREQS:** One year of college physics and college calculus.

ATS 521. CLIMATE MODELING (4). Numerical models of the physics, chemistry, biology, and geology of the climate system. A range of climate models from a simple, single equation to complex state-of-the-science systems used for future projections. Theoretical concepts will be linked to practical applications through hands-on programming exercises and data analysis. Lec/lab. **PREREQS:** ATS 420/ATS 520 (recommended, talk to instructor if not taken); no prior programming knowledge required.

ATS 546. EXPERIMENTAL ENERGY AND GAS EXCHANGE (4). Experimental methods to quantify the atmospheric carbon dioxide, water, methane, heat, momentum, and radiative exchange at the vegetation-land-ocean-air interface. Techniques include bulk and gradient approaches, and eddy covariance. The central activity consists of student teams designing and conducting a field experiment, analyzing and interpreting observations, and presenting results. Lec/lab/discussion/activity. **PREREQS:** (ATS 516 or ATS 564 or FS 564 or ATS 516) or equivalent. Talk to instructor when no theoretical and conceptual background exists; basic programming skills in Matlab or IDL desirable.

ATS 564. INTERACTIONS OF VEGETATION AND ATMOSPHERE (3). Quantitative treatment of radiation, heat, mass, and momentum exchange between vegetation and atmosphere; forest, natural and agricultural ecosystem examples. Physical and biological controls of carbon dioxide and water vapor exchange; remote sensing of canopy processes; models of stand-scale evaporation, photosynthesis and respiration; landscape and regional scale exchanges; vegetation and planetary boundary layer coupling; vegetation in global climate models. **PREREQS:** MTH 251 and PH 201

ATS 575. PLANETARY ATMOSPHERES (3). Origin and evolution of planetary atmospheres; vertical structure of atmospheres; hazes and clouds; atmospheric motions and general circulation. Presentation of recent observations and current research issues, focusing on Venus, Earth, Mars, Jupiter, Saturn, and Titan. Emphasis on comparative aspects and simple models. **PREREQS:** MTH 254 and PH 213

ATS 590. SELECTED TOPICS (1-4). Maximum of 12 credits may be used in a graduate program. This course is repeatable for a maximum of 12 credits.

ATS 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

ATS 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

ATS 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

ATS 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

ATS 607. SEMINAR (1). One-credit sections. Graded P/N. This course is repeatable for a maximum of 99 credits.

ATS 613. AEROSOL AND CLOUD PHYSICS (3). Formation, composition and Brownian coagulation of atmospheric aerosol. Nucleation, composition, growth and evaporation of cloud droplets and ice crystals; precipitation processes. Scavenging of aerosol by cloud droplets. **PREREQS:** (ATS 511 and ATS 513)

ATS 615. LARGE-SCALE INTERACTIONS OF THE OCEAN AND ATMOSPHERE (3). Ocean-atmosphere circulations in the time-mean and seasonal cycles, equatorial wave modes, El Niño-Southern Oscillation, Madden-Julian oscillation, teleconnections and atmospheric bridges, mid-latitude air-sea interactions, Pacific and Atlantic decadal variability, the North Atlantic oscillation/Arctic oscillation. **PREREQS:** (ATS 515 or OC 670) and/or instructor approval.

ATS 630. CLIMATE DYNAMICS (3). Physical basis of climate and climatic change; radiation budget, surface energy budget, atmosphere and ocean circulation; energy balance models and their application to problems in climate change. Offered alternate years. **PREREQS:** MTH 254 and PH 213

ATS 655. MESOSCALE NUMERICAL MODELING (3). Review and classification of governing equations, finite difference approaches, Galerkin methods, truncation error and accuracy of solutions. Analysis of numerical stability, boundary conditions, and gridding methods focusing on issues relevant to mesoscale modeling such as nesting and terrain-following coordinate systems. Discussion of elliptical systems and methods for pressure solution. Study of current models with emphasis on turbulence parameterization, microphysics and initialization. Development of simple models and application of existing model systems. **PREREQS:** ((ATS 515 and ATS 516) or OC 671) and/or instructor approval.

ATS 690. SELECTED TOPICS (1-16). Maximum of 12 credits may be used in a graduate program. This course is repeatable for a maximum of 12 credits.

■ ENVIRONMENTAL SCIENCES COURSES

ENSC 101. ENVIRONMENTAL SCIENCES ORIENTATION (1). Introduction to the Environmental Sciences Program and related professional and educational opportunities. Recommended for all freshman and first-year transfer environmental sciences majors, but open to all students interested in learning about career options in the environmental sciences. Graded P/N.

ENSC 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ENSC 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor and departmental approval required.

ENSC 402. INDEPENDENT STUDIES (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 405. READING AND CONFERENCE (1-12). This course is repeatable for a maximum of 12 credits. **PREREQS:** Instructor and

departmental approval required.

ENSC 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 410. INTERNSHIP (1-12). Supervised practical experience working with professionals at selected cooperating institutions, agencies, laboratories, or companies. Graded P/N. This course is repeatable for a maximum of 12 credits. **PREREQS:** Instructor and departmental approval required.

ENSC 479. *^ENVIRONMENTAL CASE STUDIES (3). Improves students' ability to ask questions, gather and synthesize information, and communicate ideas on environmental topics. Instruction and information necessary for the course is entirely Web based. (Bacc Core Course) (Writing Intensive Course) **PREREQS:** One year of college biology or chemistry and junior standing required.

ENSC 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ENSC 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

ENSC 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

ENSC 510. INTERNSHIP (1-12). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

ENSC 515. ENVIRONMENTAL PERSPECTIVES AND METHODS (3). Unique perspective or method each quarter. Possibilities include: remote sensing, modeling over a range of scales in time, space, and levels of system organization; and risk analysis.

ENSC 520. ENVIRONMENTAL ANALYSIS (3). Develop analytical thinking, explore analytical approaches, enhance writing skills, and gain experience in oral communication about environmental issues.

ENSC 530. RESEARCH PROFILES (1-2). Faculty and graduate student environmental research presentations.

ENSC 599. SELECTED TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ENSC 601. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

ENSC 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

PREREQS: Departmental approval required.

ENSC 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 630. RESEARCH PROFILES (1-2). Faculty and graduate student environmental research presentations.

ENSC 699. SELECTED TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

■ GEOSCIENCES COURSES

GEO 101. *THE SOLID EARTH (4). Solid earth processes and materials. Earthquakes, volcanoes, earth structure, rocks, minerals, ores. Solid earth hazard prediction and planning. Geologic time. Lec/lab. (Bacc Core Course)

GEO 102. *THE SURFACE OF THE EARTH (4). Processes that shape the earth's surface. Weathering mass movement, ice dynamics, biogeography, climate, surface and ground water flow. Use of maps and imagery. Lec/lab. (Bacc Core Course)

GEO 105. *GEOGRAPHY OF THE NON-WESTERN WORLD (3). An introduction to the rich variety of environments, population and settlement dynamics, cultures, geopolitical changes, and economies in Africa, the Middle East, and Asia. Lec/lab/rec. (Bacc Core Course)

GEO 105H. *GEOGRAPHY OF THE NON-WESTERN WORLD (3). An introduction to the rich variety of environments, population and settlement dynamics, cultures, geopolitical changes, and economies in Africa, the Middle East, and Asia. Lec/lab/rec. (Bacc Core Course) **PREREQS:** Honors College approval required.

GEO 106. *GEOGRAPHY OF THE WESTERN WORLD (3). An introduction to the rich variety of environments, population and settlement dynamics, cultures, geopolitical changes, and economies in Europe and Russia, Australia and Oceania, and the Americas. (Bacc Core Course)

GEO 199. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 16 credits.

GEO 201. *PHYSICAL GEOLOGY (4). Study of earth's interior. Tectonic processes and their influence on mountains, volcanoes, earthquakes, minerals, and rocks. Field trip(s) required; transportation fee charged. Lec/lab. (Bacc Core Course)

GEO 201H. *PHYSICAL GEOLOGY (4). Study of earth's interior. Tectonic processes and their influence on mountains, volcanoes, earthquakes, minerals, and rocks. Field trip(s) required; transportation fee charged. Lec/lab. (Bacc Core Course) **PREREQS:** Honors College approval required.

GEO 202. *EARTH SYSTEMS SCIENCE (4). Surficial processes (glaciers, rivers), climate, soils, vegetation, and their interrelationships. Field trip(s) required; transportation fee charged. Lec/lab. (Bacc Core Course)

GEO 203. *EVOLUTION OF PLANET EARTH (4). History of earth and life as interpreted from fossils and the rock record. Field trip(s) required; transportation fee charged. Lec/lab. (Bacc Core Course)

GEO 221. *ENVIRONMENTAL GEOLOGY (4). Introductory geology emphasizing geologic hazards (volcanoes, earthquakes, landslides, flooding), geologic resources (water, soil, air, mineral, energy), and associated environmental problems and mitigation strategies. Lec/lab. (Bacc Core Course)

GEO 295. INTRODUCTION TO FIELD GEOLOGY (3). Two-week course taught in the fall program in various locations throughout the west. Collect field data to make geological maps, cross-sections, columns, and reports. Serves as an introduction to upper-level course work for Geology degree. Lec/lab. **PREREQS:** (GEO 201 and GEO 202)

GEO 296. INTRODUCTION TO GEOGRAPHIC FIELD RESEARCH (3). Two-week course taught in the fall program in various locations throughout the west. Collect and analyze data associated with both human and physical geography. Lec/lab. **PREREQS:** GEO 201 and GEO 202

GEO 300. *SUSTAINABILITY FOR THE COMMON GOOD (3). Geography of human relationships to earth's systems with an emphasis on individual impacts and collective efforts to achieve environmental sustainability. Lec/rec. (Bacc Core Course) **PREREQS:** Upper-division standing.

GEO 300H. *SUSTAINABILITY FOR THE COMMON GOOD (3). Geography of human relationships to earth's systems with an emphasis on individual impacts and collective efforts to achieve environmental sustainability. Lec/rec. (Bacc Core Course) **PREREQS:** Upper-division standing. Honors College approval required.

GEO 301. MAP AND IMAGE INTERPRETATION (4). Reading, analysis, and interpretation of maps/remote sensing images used by geoscientists. Use of topographic, geologic, nautical and other geoscience maps; basic air photo interpretation. Lec/lab.

GEO 305. *LIVING WITH ACTIVE CASCADE VOLCANOES (3). The impact of volcanic activity on people, infrastructure, and natural resources; how and why volcanic activity in the Cascade Range occurs; volcano monitoring and hazard assessment. Field trip required, transportation fee charged. (Bacc Core Course)

GEO 306. *MINERALS, ENERGY, WATER, AND THE ENVIRONMENT (3). Geologic occurrences, environmental consequences, and future of non-renewable earth resources, including metals, materials, oil, soil, and groundwater. (Bacc Core Course)

GEO 307. *NATIONAL PARK GEOLOGY AND PRESERVATION (3). National parks as classrooms to study geological processes and the importance of preserving natural landscapes. Field trip(s) required; transportation fee charged. (Bacc Core Course)

GEO 307H. *NATIONAL PARK GEOLOGY AND PRESERVATION (3). National parks as classrooms to study geological processes and the importance of preserving natural landscapes. Field trip(s) required; transportation fee charged. (Bacc Core Course) **PREREQS:** Honors College approval required.

GEO 308. *GLOBAL CHANGE AND EARTH SCIENCES (3). Study of global change over different time scales during the history of the earth, with emphasis on evolution of its atmosphere, plate tectonics, paleoclimates, and mass extinctions. (Bacc Core Course)

GEO 309. *ENVIRONMENTAL JUSTICE (3). Technical and social issues surrounding the unequal exposure to environmental hazards based on race and the environmental justice movement that has grown to address charges of such environmental racism. (Bacc Core Course) **PREREQS:** (WR 121 or WR 121H) and sophomore standing

GEO 310. EARTH MATERIALS I: MINERALOGY (4). Principles of crystal morphology, and structure. Characteristics, identification, and origins of minerals. Lec/lab. **PREREQS:** (GEO 201 or GEO 221) and students should concurrently enroll in CH 121 or CH 221 or ((CH 231 and CH 261) or (CH 231H and CH 261H))

GEO 315. EARTH MATERIALS II: PETROLOGY (4). Origin, identification and classification of igneous, sedimentary, and metamorphic rocks. Field trip(s) required, transportation fee charged. Lec/lab. **PREREQS:** GEO 310

GEO 322. SURFACE PROCESSES (4). Examination of surficial processes and terrestrial landforms of the earth, including slopes, rivers, glaciers, deserts, and coastlines. Field trip(s)

required; transportation fee charged. Lec/lab.
PREREQS: (GEO 102 or GEO 102H or GEO 202)

GEO 323. ^CLIMATOLOGY (4). Systematic analysis of global and regional climates. Physical principles of climate, climate classifications, and distribution and characteristics of climate regimes. Lec/lab. (Writing Intensive Course) **PREREQS:** GEO 101 and GEO 202

GEO 324. GEOGRAPHY OF LIFE: SPECIES DISTRIBUTIONS AND CONSERVATION (4). Plant, animal, and biotic community distribution and dynamics. Effect of climate, tectonics, disturbance on extinction, speciation, and succession. Field trip(s) required; transportation fee charged. Lec/lab.

GEO 325. *GEOGRAPHY OF AFRICA (3). An introduction to the physical, historical, cultural, political, and development geography of Africa south of the Sahara. Offered alternate years. (NC) (Bacc Core Course)

GEO 326. *GEOGRAPHY OF EUROPE (3). A regional overview precedes a topical examination of Europe's diverse physical and cultural landscapes and lifestyles. (Bacc Core Course)

GEO 327. *GEOGRAPHY OF ASIA (3). Geographic analysis of Asia's lands and peoples. Emphasis on regional physical environments, resources and development potentials, population trends, and international importance to the United States. May not be offered each year. (NC) (Bacc Core Course)

GEO 328. *GEOGRAPHY OF LATIN AMERICA (3). Focuses on the diverse landscapes, peoples and cultural traditions of Latin America, a vast region extending from the United States-Mexican border to the southern tip of South America. (NC) (Bacc Core Course)

GEO 329. *GEOGRAPHY OF THE UNITED STATES AND CANADA (3). Cultural, economic, political, and settlement geography. Emphasis on regional patterns and problems. Analysis of recent and projected changes. (Bacc Core Course)

GEO 330. *^GEOGRAPHY OF INTERNATIONAL DEVELOPMENT AND GLOBALIZATION (3). Introduction to the geography of global wealth and inequality with a focus on contemporary development, underdevelopment, and globalization problems in Asian, African, Caribbean, Latin American, and Pacific Island countries. (Bacc Core Course) (Writing Intensive Course) **PREREQS:** GEO 105 or GEO 106 or instructor approval.

GEO 335. *INTRODUCTION TO WATER SCIENCE AND POLICY (3). Policy and science of the hydrologic cycle. Emphasis on interaction between water's natural time-space fluctuations and human uses. (Bacc Core Course) **CROSSLISTED** as SOIL 335.

GEO 335H. *INTRODUCTION TO WATER SCIENCE AND POLICY (3). Policy and science of the hydrologic cycle. Emphasis on interaction between water's natural time-space fluctuations and human uses. (Bacc Core Course) **PREREQS:** Honors College approval required.

GEO 340. STRUCTURAL GEOLOGY (4). Analysis of geometry and kinematics of geologic structures including brittle and ductile faults, folds, joints, deformation fabrics. Field trip(s) required; transportation fee charged. Lec/lab. **PREREQS:** GEO 201

GEO 350. *POPULATION GEOGRAPHY (3). Patterns of spatial distribution of human populations, data sources, data display, population structure and dynamics, relationship between population, resources, and quality of life. Problems of growth and alternative futures. Offered alternate years. (SS) (Bacc Core Course) **PREREQS:** Upper-division standing.

GEO 352. *OREGON: GEOLOGY, PLACE, AND LIFE ON THE RING OF FIRE (4). Provides an overview of the geology of Oregon in the context

of the Pacific Northwest including tectonic setting, geologic features and landscapes, as well as topics and concepts of interest to society in general. Lessons will include discussion of the relationship between people and the landscape, incorporating the concept of ethnographic landscapes—geologic structures, natural resources and geologic hazards that are part of the identity of a place. Emphasizes written and graphic communication skills. Field trip required, transportation fee charged. Lec/lab. (Bacc core course) **PREREQS:** Introductory science course recommended.

GEO 360. CARTOGRAPHY (4). Basic cartographic principles. Design, compilation, and construction of maps. Lec/lab.

GEO 365. INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS (4). Introduction to the principles of geographic information systems (GIS) and experience using a widely popular geographic information system for spatial data input, analysis, and display. **PREREQS:** (GEO 301 or GEO 360) strongly recommended.

GEO 370. STRATIGRAPHY AND SEDIMENTOLOGY (4). Basic principles of sedimentology and stratigraphy. Sedimentology is largely concerned with classifying and interpreting the origin of sedimentary rocks. Stratigraphy provides formal rules and strategies for organizing sedimentary (and other) rocks into a temporal framework. Reconstruction of Earth history with various approaches centered on paleoclimatology, paleogeography, paleoceanography, and tectonics. Lec/lab. **PREREQS:** GEO 201

GEO 380. *EARTHQUAKES IN THE PACIFIC NORTHWEST (3). Earthquake hazards in the Northwest; responses to reducing earthquake risk at state, local, and personal levels. (Bacc Core Course)

GEO 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

GEO 399H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

GEO 400. FIELD TRIPS (1-16). Participation in group field trips that are not a part of any other course. Transportation fee is charged. Students may prepare guides for trips. Faculty sponsor must be prearranged. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GEO 401. RESEARCH (1-16). Independent, original research subjects guided by faculty conferences and resulting in a brief written report. Faculty sponsor must be prearranged. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GEO 403. THESIS (1-16). Independent, original study that culminates in a senior thesis. Faculty sponsor must be prearranged. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GEO 405. READING AND CONFERENCE (1-16). Independent reading in specialized topics guided by and discussed in faculty conferences. Faculty sponsor must be prearranged. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GEO 407. SEMINAR (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GEO 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GEO 409. CONTEMPORARY EARTH SCIENCE ISSUES (3). In-depth examination of selected significant issues in the geosciences. Topics vary. Emphasis on problem solving and collaborative research. **PREREQS:** Senior standing in geology, geography, earth science, or natural resources.

GEO 410. INTERNSHIP (1-15). Pre-career professional experience under joint faculty and employer supervision. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** 12 credits of upper-division geosciences and departmental approval required.

GEO 412. IGNEOUS PETROLOGY (4). Petrogenesis of igneous rocks. Petrographic analysis using polarizing microscopes. Field trip may be required, transportation fee charged. Lec/lab. **PREREQS:** GEO 315 and GEO 415

GEO 415. EARTH MATERIALS III: IGNEOUS PETROGRAPHY (4). Microscope-based study of minerals and igneous, sedimentary and metamorphic rocks. Representation and interpretation of geological processes based on microscopic observation. Lec/lab. **PREREQS:** GEO 201 and GEO 310 and GEO 315

GEO 420. GEOGRAPHY OF RESOURCE USE (3). Functional concepts of resources, institutions affecting resource use, role of resources; resource supply, bases of controversy. Field trip(s) may be required; transportation fee charged. **PREREQS:** 9 credits of upper-division geography.

GEO 423. LAND USE IN THE AMERICAN WEST (3). Development of a conceptual framework for land use study; analysis of land as a resource, land use trends, land use principles, and management issues as related to planning, focusing on the American West, the fastest growing region in the nation.

GEO 424. INTERNATIONAL WATER RESOURCES MANAGEMENT (3). An investigation of the various approaches to water resources geography at the international level. Explores the interaction between water science and policy through issues of current "hydropolitics" and water resources development. Topics include water quality, dams and development, conflict and cooperation, climate change, and water institutions. Offered separately as GEO 424 and GEO 524. **PREREQS:** 9 credits of upper-division geography and any course dealing with the hydrologic cycle.

GEO 425. WATER RESOURCES MANAGEMENT IN THE UNITED STATES (3). An investigation of the various approaches to water resources geography within the U.S. Explores the disciplines that address water resources management, their tools, and their limitations. Topics include engineering, law, economics, risk assessment, game theory, conflict resolution, and the fine arts. Offered separately as GEO 425 and GEO 525. **PREREQS:** 9 credits of upper-division geography and any course dealing with the hydrologic cycle.

GEO 426. GLOBAL RESOURCES AND DEVELOPMENT (3). Examines resource development issues and strategies in the Global South. Issues and strategies from agriculture, forestry, fisheries, energy, wildlife management, mineral development, land use, and health are examined. Offered every other odd year in spring.

GEO 427. ^VOLCANOLOGY (4). A survey of volcanoes: their distribution, forms, composition, eruptive products, eruptive styles, and associated phenomena. Field trip may be required; transportation fee charged. Offered alternate years. Lec/lab. (Writing Intensive Course) **PREREQS:** GEO 315

GEO 429. TOPICS IN RESOURCE GEOGRAPHY (3). Fundamental problems with stress upon methods of analysis. Topics vary. Not offered every year. This course is repeatable for a maximum of 6 credits. **PREREQS:** 9 credits of upper-division geography.

GEO 430. GEOCHEMISTRY (4). Principles of geochemistry applied to problems of earth science. Field trip(s) may be required; transportation fees charged. Lec/rec. **PREREQS:** GEO 315 and (CH 121 and CH 122) or (CH 221 and CH 222)

GEO 432. APPLIED GEOMORPHOLOGY (3). Effect of landform processes upon human activity; consequences of resource management strategies on erosional balance within landscape; identification of mitigation of natural hazards; role of geomorphic process studies in environmental planning. Taught as seminar, themes TBA. Field trip(s) may be required; transportation fee charged. **PREREQS:** GEO 322

GEO 433. COASTAL GEOMORPHOLOGY (3). Morphodynamic approach to coastal landforms, processes and evolution including the impacts and response of humans to coastal change. **PREREQS:** ((PH 211 or PH 211H) and (PH 212 or PH 212H) and GEO 322) and MTH 251 and MTH 252 or equivalent.

GEO 439. TOPICS IN PHYSICAL GEOGRAPHY (3). Fundamental problems with stress upon methods of analysis. Topics vary. Not offered every year. This course is repeatable for a maximum of 6 credits.

GEO 440. ECONOMIC GEOLOGY (4). Principles of the origin, distribution, and importance of metallic mineral deposits formed by magmatic, hydrothermal, and sedimentary processes. Lec/lab. **PREREQS:** GEO 315 and GEO 340

GEO 444. REMOTE SENSING (4). Fundamentals of satellite remote sensing and image analysis. Topics include physical principles of remote sensing from the ultraviolet to the microwave, sensors and sensor technology, and environmental applications of remote sensing through image analysis. Lec/lab. **PREREQS:** GEO 301 is recommended.

GEO 445. COMPUTER-ASSISTED CARTOGRAPHY (3). Concepts and techniques underlying the production of maps by computer. Practical experience with a variety of computer mapping packages. Lec/lab. **PREREQS:** GEO 360 and MTH 112

GEO 451. ENVIRONMENTAL SITE PLANNING (3). The use of geographic concepts/techniques in land use and site planning; especially natural area inventory, classification and analysis. Findings-of-fact presentation and report writing. Two local field trips may be required; transportation fee charged. Offered alternate years.

GEO 452. PRINCIPLES AND PRACTICES OF RURAL AND RESOURCE PLANNING (3). Principles, techniques, and current practices of land use planning for rural areas. Emphasis on resource issues, organization of data, policy development, and decision-making. Offered alternate years. **PREREQS:** GEO 423 or GEO 523

GEO 453. RESOURCE EVALUATION METHODS/EIS (3). Methods of resource analysis for land use planning; resource rating systems; environmental impact assessment: laws, procedures, and methods. Field trip(s) may be required; transportation fee charged. Offered alternate years. **PREREQS:** GEO 452

GEO 460. MULTIMEDIA CARTOGRAPHY (4). Map design principles and technology for multimedia cartography, especially interactive and animated mapping. Laboratory experience with interactive and animated mapping software. Lec/lab. **PREREQS:** GEO 360

GEO 461. GEOLOGY OF EARTHQUAKES (3). Tectonics of the present day as based on surface geology, geodesy, seismicity, and crustal structure; description of active faults and folds; use of neotectonics in evaluation of earthquake hazard. Field trip(s) may be required; transportation fee charged. Offered alternate years. **PREREQS:** GEO 340

GEO 463. ^GEOPHYSICS AND TECTONICS (4). Geophysical observations as constraints on geologic interpretation. Lec/lab. (Writing Intensive Course) **PREREQS:** MTH 251 and (PH 202 or PH 212) or equivalent.

GEO 465. GEOGRAPHIC INFORMATION SYSTEMS AND SCIENCE (4). Introduces

students to the theory and techniques of geospatial analysis within a GIS. Focuses on developing a foundation in geospatial reasoning skills. Building upon the introductory material presented in GEO 365, this course will guide students through the process of developing and carrying out geospatial analyses using various spatial data structures, techniques and models. It will culminate in the completion of a geospatial analysis project developed by the student. Lec/lab. **PREREQS:** GEO 365 or instructor approval.

GEO 466. DIGITAL IMAGE PROCESSING (3). Digital analysis of remote sensor data. Image display enhancement, classification, and rectification principles. Practical experience with an image processing system. Offered alternate years. Lec/lab. **PREREQS:** GEO 444

GEO 469. TOPICS IN GEOGRAPHIC TECHNIQUES (3). Advanced and specialized geographic information processing techniques, procedures, and applications. Topics vary. Not offered every year. This course is repeatable for a maximum of 6 credits.

GEO 481. GLACIAL GEOLOGY (4). Mass balance of glaciers, physics of glacial flow, processes of glacial erosion and deposition, glacial meltwater, glacial isostasy and eustasy, and Quaternary stratigraphy. Field trip(s) may be required; transportation fee charged. Lec/lab. Offered alternate years. **PREREQS:** GEO 202

GEO 483. SNOW HYDROLOGY (3). Fundamentals of snow hydrology. Physical principles of snow formation, snowpack accumulation, energy balance, snowcover-climate interactions, snow metamorphism, snowpack ablation, snowpack/snowmelt chemistry, remote sensing of snow, avalanches, field methods, snowmelt/runoff modeling techniques, and watershed processes. **PREREQS:** GEO 202 and MTH 111

GEO 484. INTRODUCTION TO BIOGEOCHEMISTRY (3). Interdisciplinary course, applying concepts from chemistry, physics, biology and geology to Earth systems including terrestrial, ocean and freshwater environments; water and energy cycles; carbon, nitrogen, phosphorus and sulfur cycles; biogeochemical cycles through Earth history. **PREREQS:** MTH 111 and ((CH 121 and CH 122) or (CH 231 and CH 261 and CH 232 and CH 262))

GEO 486. QUATERNARY PALEOCLIMATOLOGY (3). Introduction to geochronology, climate proxies, climate forcing, and climate modeling applied to paleoclimate problems. Emphasis on Quaternary climate history. **PREREQS:** (GEO 202 or GEO 203) and (CH 122 or CH 222 or ((CH 232 or CH 232H) and (CH 262 or CH 262H or CH 272)) and PH 201 or PH 211 or equivalent.

GEO 487. HYDROGEOLOGY (4). Movement of water through porous media. Darcy's Law and groundwater flow equation. Development of groundwater resources. Computer models. Lec/lab. **PREREQS:** (MTH 252 or MTH 252H) and GEO 202

GEO 488. QUATERNARY STRATIGRAPHY OF NORTH AMERICA (3). Stratigraphic principles applied to Quaternary deposits. Survey Quaternary dating methods. Proxy records of glaciation and climate change. Quaternary stratigraphy of North America, emphasizing stratigraphic records of ice sheets, glaciers, and pluvial lakes. Offered alternate years. **PREREQS:** (GEO 481 or GEO 581) or instructor approval required.

GEO 495. ADVANCED FIELD GEOLOGY (6). Six-week summer program in central Oregon. Collect field data to make geological maps, cross-sections, columns, and reports. Fee charged. **PREREQS:** GEO 315 and GEO 340 and GEO 295

GEO 497. FIELD MAPPING OF ORE DEPOSITS (3). Eight-day field trip over spring vacation to a mineral district in the western United States,

emphasizing detailed mapping of outcrops, trenches, and underground workings. Students prepare final maps and a report suitable for presentation to management or publication during spring term. Transportation fee charged. Not offered every year. **PREREQS:** (GEO 440 or GEO 540) and GEO 495

GEO 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

GEO 500. FIELD TRIPS (1-16). Participation in group field trips that are not a part of any other course. Transportation fee is charged. Students may prepare guides for trips. Faculty sponsor must be prearranged. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GEO 501. RESEARCH (1-16). Independent, original research subjects guided by faculty conferences and resulting in a brief written report. Faculty sponsor must be prearranged. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GEO 503. THESIS (1-16). Independent, original study that culminates in a senior thesis. Faculty sponsor must be prearranged. This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

GEO 505. READING AND CONFERENCE (1-16). Independent reading in specialized topics guided by and discussed in faculty conferences. Faculty sponsor must be prearranged. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GEO 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GEO 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GEO 510. INTERNSHIP (1-15). Pre-career professional experience under joint faculty and employer supervision. May not be used to meet minimum credit hour requirements for graduate degrees in geosciences. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** 12 credits of upper-division geosciences.

GEO 512. IGNEOUS PETROLOGY (4). Petrogenesis of igneous rocks. Petrographic analysis using polarizing microscopes. Field trip may be required, transportation fee charged. Lec/lab. **PREREQS:** GEO 315 and GEO 415

GEO 514. GROUNDWATER HYDRAULICS (3). Principles of groundwater flow and chemical transport in confined and unconfined aquifers, aquifer testing and well construction. Design of dewatering and contaminant recovery systems. CROSSLISTED as BEE 514 and CE 514. **PREREQS:** MTH 252

GEO 515. HISTORY AND PHILOSOPHY OF GEOGRAPHY (3). The historical development of research traditions in the discipline of geography. This includes an examination of changes in conceptual structures and current trends. **PREREQS:** Graduate standing in geography.

GEO 516. INTERPRETATION OF GEOLOGIC MAPS (2). Development of skills in formulating geologic problems, using geologic maps, and developing solutions by the scientific method. **PREREQS:** GEO 495

GEO 518. GEOSCIENCE COMMUNICATION (3). Professional development of the skills of technical editing and writing for geoscientists. Practice the craft of presentation development and delivery, and the broader issues of problem development, and manuscript and proposal writing specific to geoscience graduate students.

GEO 520. GEOGRAPHY OF RESOURCE USE (3). Functional concepts of resources, institutions affecting resource use, role of resources; resource

supply, bases of controversy. Field trip(s) may be required; transportation fee charged. **PREREQS:** 9 credits of upper-division geography.

GEO 523. LAND USE IN THE AMERICAN WEST (3). Development of a conceptual framework for land use study; analysis of land as a resource, land use trends, land use principles, and management issues as related to planning, focusing on the American West, the fastest growing region in the nation.

GEO 524. INTERNATIONAL WATER RESOURCES MANAGEMENT (3). An investigation of the various approaches to water resources geography at the international level. Explores the interaction between water science and policy through issues of current “hydropolitics” and water resources development. Topics include water quality, dams and development, conflict and cooperation, climate change, and water institutions. Offered separately as GEO 424 and GEO 524. **PREREQS:** 9 credits of upper-division geography and any course dealing with the hydrologic cycle.

GEO 525. WATER RESOURCES MANAGEMENT IN THE UNITED STATES (3). An investigation of the various approaches to water resources geography within the U.S. Explores the disciplines that address water resources management, their tools, and their limitations. Topics include engineering, law, economics, risk assessment, game theory, conflict resolution, and the fine arts. Offered separately as GEO 425 and GEO 525. **PREREQS:** 9 credits of upper-division geography.

GEO 526. GLOBAL RESOURCES AND DEVELOPMENT (3). Examines resource development issues and strategies in the Global South. Issues and strategies from agriculture, forestry, fisheries, energy, wildlife management, mineral development, land use, and health are examined. Offered every other odd year in spring.

GEO 527. VOLCANOLOGY (4). A survey of volcanoes: their distribution, forms, composition, eruptive products, eruptive styles, and associated phenomena. Field trip may be required; transportation fee charged. Offered alternate years. Lec/lab. **PREREQS:** GEO 315

GEO 529. TOPICS IN RESOURCE GEOGRAPHY (3). Fundamental problems with stress upon methods of analysis. Topics vary. Not offered every year. This course is repeatable for a maximum of 6 credits. **PREREQS:** 9 credits of upper-division geography.

GEO 530. GEOCHEMISTRY (4). Principles of geochemistry applied to problems of earth science. Field trip(s) may be required; transportation fees charged. Lec/rec. **PREREQS:** GEO 315* and ((CH 122 or CH 222) or (CH 221 and CH 222))

GEO 532. APPLIED GEOMORPHOLOGY (3). Effect of landform processes upon human activity; consequences of resource management strategies on erosional balance within landscape; identification of mitigation of natural hazards; role of geomorphic process studies in environmental planning. Taught as seminar, themes TBA. Field trip(s) may be required; transportation fee charged. **PREREQS:** GEO 322

GEO 533. COASTAL GEOMORPHOLOGY (3). Morphodynamic approach to coastal landforms, processes and evolution including the impacts and response of humans to coastal change. **PREREQS:** MTH 251 and MTH 252 and PH 211 and PH 212 or equivalent and GEO 322 or equivalent.

GEO 534. FIELD GEOGRAPHY OF OREGON (3). Designed to introduce students to the widest possible range of topics on all aspects of Oregon geography within a limited time, then turn that experience into a viable research proposal. While physical processes are the primary topic, resource and environmental effects are stressed.

GEO 535. GEOCHEMICAL ANALYSIS TECHNIQUES (3). An introduction to the theory, techniques and instrumentation used for the chemical analysis of earth materials, with emphasis on analysis of solid earth material samples (predominantly, but not restricted to, rocks). Includes discussions of laboratory safety, relevant statistical approaches, basic physical and chemical principles of analysis, sample preparation techniques and data processing and reporting. Course also includes a large component of hands-on experience with instrumentation available in-house in the College of Earth, Ocean, and Atmospheric Sciences. Lec/lab. **PREREQS:** GEO 530 and /or equivalent.

GEO 536. STRUCTURAL AND NEOTECTONIC FIELD METHODS (3). Field-intensive mapping experience emphasizing a topical issue in active tectonics, neotectonics, earthquake geology, or structural geology. One-week field trip required; transportation fee charged. Weekly discussions during quarter. Offered alternate years. **PREREQS:** GEO 495

GEO 537. TECTONIC GEOMORPHOLOGY (3). Exploration of linkages between patterns of erosion, crustal deformation, and landscape evolution from geomorphic, geologic, geophysical, and modeling perspectives. Field trip required; transportation fee charged. Offered alternate years. **PREREQS:** GEO 322 and GEO 340

GEO 539. TOPICS IN PHYSICAL GEOGRAPHY (3). Fundamental problems with stress upon methods of analysis. Topics vary. Not offered every year. This course is repeatable for a maximum of 9 credits.

GEO 540. ECONOMIC GEOLOGY (4). Principles of the origin, distribution, and importance of metallic mineral deposits formed by magmatic, hydrothermal, and sedimentary processes. Lec/lab. **PREREQS:** GEO 315 and GEO 340

GEO 541. SPATIO-TEMPORAL VARIATION IN ECOLOGY AND EARTH SCIENCE (4). Objectives and techniques of spatial and temporal analysis. Point patterns, geostatistics, spectral analysis, wavelet analysis, interpolation, and mapping. Lec/lab. **PREREQS:** ST 411 or ST 511

GEO 544. REMOTE SENSING (4). Fundamentals of satellite remote sensing and image analysis. Topics include physical principles of remote sensing from the ultraviolet to the microwave, sensors and sensor technology, and environmental applications of remote sensing through image analysis. **PREREQS:** GEO 301 is recommended.

GEO 545. COMPUTER-ASSISTED CARTOGRAPHY (3). Concepts and techniques underlying the production of maps by computer. Practical experience with a variety of computer mapping packages. Lec/lab. **PREREQS:** GEO 360 and MTH 112

GEO 546. ADVANCED LANDSCAPE AND SEASCAPE ECOLOGY (4). Pattern-process interactions in large scale ecological and physical systems, including terrestrial, aquatic, and marine/ocean ecosystems. Principles of pattern-process interactions from genetic to community levels of ecological organization applied to design of conservation reserves. Hypothesis testing, field techniques, spatial models/statistics, GIS/remote sensing. Lec/lab.

GEO 548. FIELD RESEARCH IN GEOMORPHOLOGY AND LANDSCAPE ECOLOGY (3). Natural history interpretation of disturbance and recovery processes and management implications in forest-stream landscapes of western Oregon. Course consists of field experience and several seminars. Transportation and lodging fee charged. **PREREQS:** 9 graduate credits of sciences or engineering.

GEO 551. ENVIRONMENTAL SITE PLANNING (3). The use of geographic concepts/techniques in land use and site planning; especially natural area

inventory, classification and analysis. Findings-of-fact presentation and report writing. Two local field trips may be required; transportation fee charged. Offered alternate years.

GEO 552. PRINCIPLES AND PRACTICES OF RURAL AND RESOURCE PLANNING (3). Principles, techniques, and current practices of land use planning for rural areas. Emphasis on resource issues, organization of data, policy development, and decision-making. Offered alternate years. **PREREQS:** GEO 423 or GEO 523

GEO 553. RESOURCE EVALUATION METHODS/EIS (3). Methods of resource analysis for land use planning; resource rating systems; environmental impact assessment: laws, procedures, and methods. Field trip(s) may be required; transportation fee charged. Offered alternate years. **PREREQS:** GEO 452

GEO 560. MULTIMEDIA CARTOGRAPHY (4). Map design principles and technology for multimedia cartography, especially interactive and animated mapping. Laboratory experience with interactive and animated mapping software. Lec/lab. **PREREQS:** GEO 360

GEO 561. GEOLOGY OF EARTHQUAKES (3). Tectonics of the present day as based on surface geology, geodesy, seismicity, and crustal structure; description of active faults and folds; use of neotectonics in evaluation of earthquake hazard. Field trip(s) may be required; transportation fee charged. Offered alternate years. **PREREQS:** GEO 340

GEO 563. GEOPHYSICS AND TECTONICS (4). Geophysical observations as constraints on geologic interpretation. Lec/lab. **PREREQS:** MTH 251 and (PH 202 or PH 212) or equivalent

GEO 565. GEOGRAPHIC INFORMATION SYSTEMS AND SCIENCE (4). Introduction to modern spatial data processing, development, and functions of geographic information systems (GIS); theory, concepts and applications of geographic information science (GISci). Lec/lab.

GEO 566. DIGITAL IMAGE PROCESSING (3). Digital analysis of remote sensor data. Image display enhancement, classification, and rectification principles. Practical experience with an image processing system. Offered alternate years. Lec/lab. **PREREQS:** GEO 544

GEO 567. RESPONSIBLE GIS PRACTICE: ETHICS FOR FUTURE GEOSPATIAL PROS (3). Prepares current and aspiring professionals to recognize, analyze and address ethical issues in geographic information science and technology. **PREREQS:** Instructor approval required.

GEO 568. INTERACTIVE CARTOGRAPHY AND GEOVISUALIZATION (4). An overview of methods and applications in interactive, dynamic cartographic visualization, including the skills of designing, building, and evaluating customized user-interfaces to geographic information. Introduces students to a working knowledge of web programming to create interactive mapping applications, focusing on client-side technology. **PREREQS:** Basic programming experience (any language) and one GIS course; or instructor approval required.

GEO 569. TOPICS IN GEOGRAPHIC TECHNIQUES (3). Advanced and specialized geographic information processing techniques, procedures, and applications. Topics vary. Not offered every year. This course is repeatable for a maximum of 6 credits.

GEO 580. ADVANCED GIS APPLICATIONS IN THE GEOSCIENCES (4). Advanced geographic information science theory, analysis, and projects involving geosciences, coastal/marine, and other natural resource studies. Advanced training in a professional grade GIS package. Lec/lab. **PREREQS:** GEO 465 or GEO 565 or equivalent

GEO 581. GLACIAL GEOLOGY (4). Mass balance of glaciers, physics of glacial flow,

processes of glacial erosion and deposition, glacial meltwater, glacial isostasy and eustasy, and Quaternary stratigraphy. Field trip(s) may be required; transportation fee charged. Lec/lab. Offered alternate years. **PREREQS:** GEO 202

GEO 582. GEOMORPHOLOGY OF FORESTS AND STREAMS (3). Physical processes (erosion, transport, deposition, hydraulics, morphology) and biotic interactions on hillslopes, riparian zones, and fluvial systems at multiple spatial and temporal scales. Offered alternate years. **PREREQS:** 9 graduate credits of sciences or engineering.

GEO 583. SNOW HYDROLOGY (3). Fundamentals of snow hydrology. Physical principles of snow formation, snowpack accumulation, energy balance, snowcover-climate interactions, snow metamorphism, snowpack ablation, snowpack/snowmelt chemistry, remote sensing of snow, avalanches, field methods, snowmelt/runoff modeling techniques, and watershed processes.

GEO 586. QUATERNARY PALEOCLIMATOLOGY (3). Introduction to geochronology, climate proxies, climate forcing, and climate modeling applied to paleoclimate problems. Emphasis on Quaternary climate history. **PREREQS:** ((GEO 202 or GEO 203) and (CH 122 or CH 222 or (CH 232 and CH 262) or (CH 232H and CH 262H))) and (PH 201 or PH 211) or equivalent

GEO 588. QUATERNARY STRATIGRAPHY OF NORTH AMERICA (3). Stratigraphic principles applied to Quaternary deposits. Survey Quaternary dating methods. Proxy records of glaciation and climate change. Quaternary stratigraphy of North America, emphasizing stratigraphic records of ice sheets, glaciers, and pluvial lakes. Offered alternate years. **PREREQS:** (GEO 481 or GEO 581) or instructor approval required

GEO 593. TOPICS IN QUATERNARY GEOLOGY (2). Survey of current ideas and issues relating to Quaternary-age geologic environments. Topics may include advances in geochronology, causes of climate change, modeling of ice age geodynamics. This course is repeatable for a maximum of 10 credits.

GEO 597. FIELD MAPPING OF ORE DEPOSITS (3). Eight-day field trip over spring vacation to a mineral district in the western United States, emphasizing detailed mapping of outcrops, trenches, and underground workings. Students prepare final maps and a report suitable for presentation to management or publication during spring term. Transportation fee charged. Not offered every year. **PREREQS:** (GEO 440 or GEO 540) and GEO 495

GEO 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

GEO 600. FIELD TRIPS (1-16). Participation in group field trips that are not part of any other course. Transportation fee charged. Students may prepare guide for trips. Faculty sponsors must be arranged. Graded P/N. This course is repeatable for a maximum of 16 credits.

GEO 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

GEO 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

GEO 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

GEO 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

GEO 607. SEMINAR (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

GEO 608. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

GEO 622. IGNEOUS PETROLOGY (3). Controls on the distribution of major and trace elements;

theory, applications, and examples. Field trip(s) may be required; transportation fee charged. Offered alternate years. **PREREQS:** GEO 412 or GEO 512

GEO 633. GEOCHRONOLOGY AND ISOTOPE GEOLOGY (3). Measurements of cosmic and geologic time by radioactive decay. Use of radiogenic and stable isotopic tracers in geology. Offered alternate years. **PREREQS:** Graduate standing in geology or related fields.

GEO 691. MASS AND HEAT TRANSPORT IN THE ENVIRONMENT (4). Quantitative treatment of processes affecting transport in lakes, streams, and groundwater: advection; diffusion; dispersion. Lec/lab. Offered alternate years. **PREREQS:** (GEO 487 or CE 412) or equivalent and MTH 256

GEO 694. TOPICS IN ORE GENESIS (1-3). In-depth examination of published research on selected mineral deposits to build an understanding of environments and processes of ore formation. Offered alternate years. This course is repeatable for a maximum of 6 credits.

GEO 699. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

■ GEOPHYSICS COURSES

GPH 501. RESEARCH (1-16). Original research work that will not be part of the data used in a thesis. Graded P/N. This course is repeatable for a maximum of 16 credits.

GPH 503. THESIS (1-16). Thesis research and writing. This course is repeatable for a maximum of 999 credits.

GPH 505. READING AND CONFERENCE (1-16). Independent reading and library research on specialized topics in geophysics, guided by discussions with supervising faculty. A written report may be required. This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor and topic approval required before registration.

GPH 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

GPH 601. RESEARCH (1-16). Original research work that will not be part of the data used in a thesis. Graded P/N. This course is repeatable for a maximum of 16 credits.

GPH 603. THESIS (1-16). Thesis research and writing. This course is repeatable for a maximum of 999 credits.

GPH 605. READING AND CONFERENCE (1-16). Independent reading and library research on specialized topics in geophysics guided by discussions with supervising faculty. A written report may be required. This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor and topic approval required before registration.

GPH 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

GPH 620. PHYSICS OF THE EARTH (3). Effects of confining pressure, temperature, time, and solutions on properties of rocks; earth and moon in solar system; source materials and their reliabilities for determining nature and composition of the earth; composition of core, crust, and mantle; geodynamics; processes within the earth with special reference to their effect on earthquakes, isostasy, crustal structure, island arcs.

GPH 630. ELEMENTS OF SEISMOLOGY (4). Survey of basic concepts in global seismology: world seismicity; elastic structure of the earth; seismic wave paths in the earth; locating earthquakes; earthquake focal mechanisms, magnitudes, stress drop, energy; stress and strain, elasticity, wave equation, plane waves in homogeneous and layered media, surface waves, free oscillations; ray theory; seismometry; earthquake prediction. Laboratory

exercises include interpretation and analysis of seismograms from global seismographic networks. **PREREQS:** Differential equations.

GPH 631. THEORETICAL SEISMOLOGY (3). Representation of seismic sources, moment tensors, wave radiation from point and finite sources; wave propagation in attenuating medium; reflection and refraction of spherical waves, Lamb's problem, Cagniard-De Hoop methods; surface waves in a vertically heterogeneous medium; free oscillations of the earth. **PREREQS:** GPH 630 and Differential equations, complex analysis.

GPH 632. CRUSTAL SEISMOLOGY (3). Structure of the earth's crust and upper mantle from seismic reflection and large offset (refraction, wide-angle reflection) data. Methods of data collection, data processing theory and practice, modeling and interpretation techniques, correlation of seismic results with laboratory measurements of rock properties, and regional case studies. **PREREQS:** GPH 630

GPH 640. GEODESY (4). Physical and observational geodesy, including the Earth's gravity field and potential and determination of the Earth's geoid. Interpretation of geoid, geoid anomalies, and isostatic compensation. Gravity, point-position and remote sensing geodetic measurement techniques, including GPS, InSAR, VLBI, leveling, triangulation/trilateration, and low-Earth orbit gravity satellite missions are covered as are geodetic reference frames. Offered alternate years. **PREREQS:** .

GPH 641. ELECTROMAGNETIC METHODS IN GEOPHYSICS (3). Survey of electromagnetic (EM) methods in geophysics. Review of electromagnetic theory, Maxwell's equations in the quasi-static limit, the diffusion of EM fields in a layered conductor, qualitative discussion of EM fields in 2- and 3-D conductors. EM techniques, including DC resistivity, magnetotellurics, controlled source EM, induced polarization, and long-period magnetometer array methods. Applications to exploration, to basic research on crustal structure and to studies of upper-mantle conductivity. **PREREQS:** Upper-division EM course.

GPH 642. EARTH MAGNETISM (3). Geomagnetism and magnetic potential: general morphology and secular change; internal and external sources; principles of paleomagnetism, including field and laboratory procedures; origin of remnant magnetism in rocks and the controlling physical and chemical processes; the origin of the Earth's magnetic field. **PREREQS:** Instructor approval required.

GPH 650. GEOPHYSICAL INVERSE THEORY (4). Survey of the theory and applications of inverse methods currently used in the geophysical sciences for the interpretation of inaccurate and inadequate data. Backus-Gilbert inverse theory, resolution, regularization methods (such as damped least squares) for linear and non-linear problems, stochastic inversion, and extremal models. Applications to seismic, gravity, magnetic and electromagnetic data. **PREREQS:** Linear algebra, instructor approval required.

GPH 651. GEODYNAMICS I (3). Application of the techniques of continuum mechanics to geological problems. Thermal and subsidence history of the lithosphere; stress and strain in the earth; elasticity and flexure of the lithosphere; gravitational compensation. Offered alternate years. **PREREQS:** Instructor approval required.

GPH 652. GEODYNAMICS II (3). Application of the techniques of continuum mechanics to geological problems. Rheology of earth materials; fluid mechanics applied to the earth's mantle and to magma chambers; fluid flow in porous media. Offered alternate years. **PREREQS:** Instructor approval required.

GPH 665. GEOPHYSICAL FIELD TECHNIQUES (3). Instrumentation, field methods and

interpretation of gravimetric, magnetic, electrical and seismic prospecting techniques. Students will be required to collect, reduce, analyze, and interpret data.

GPH 689. SPECIAL TOPICS IN GEOPHYSICS (1-4). Special topics of current interest in geophysics, not covered in detail in other courses. May be repeated on different topics for credit. This course is repeatable for a maximum of 16 credits.

■ MARINE RESOURCES MANAGEMENT COURSES

MRM 501. RESEARCH AND SCHOLARSHIP (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

MRM 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

MRM 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

MRM 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

MRM 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

MRM 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

MRM 510. INTERNSHIP (1-9). Planned and supervised resource management experience with selected cooperating governmental agencies, private organizations, or business firms. Supplementary conferences, reports and evaluations. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** For marine resource management majors only.

MRM 515. COASTAL RESOURCES MANAGEMENT (4). Survey of coastal zone and nearshore ocean management institutions, policies, decision-making processes, and management tools, with a United States emphasis. Using the public policy process as an organizing framework, issues addressed include natural hazards, water quality, habitat protection, public access, and the management of coastal development. Management processes and tools include information technologies, planning, regulation, protected areas, restoration, and coordination. Offered annually.

MRM 520. COASTAL LAW (3). Examines federal and state judicial and legislative protection of public beach access rights; ownership and use of tide and submerged lands, including the public trust doctrine and the federal and state navigation servitudes; federal and state protection of wetlands; and the Federal Coastal Zone Management Act.

MRM 521. OCEAN LAW (3). Utilizing the framework of the international Law of the Sea Convention, this course covers United States law regarding renewable and non-renewable ocean energy resources, fisheries, marine mammal and marine endangered species protection, marine pollution, and marine protected areas including marine reserves.

MRM 525. SPECIAL TOPICS IN MARINE RESOURCE MANAGEMENT (1-4). Subjects of current interest in marine resource management not covered in depth in other courses. May be repeated for credit when topic varies. This course is repeatable for a maximum of 99 credits.

MRM 530. PRINCIPLES AND PRACTICE OF MARINE RESOURCE MANAGEMENT (3). Introduction to the policy skills required for the sustainable management of marine and coastal resources. Core skills required of managers such as policy analysis, cost-benefit analysis, and risk assessment are applied to topical issues that illustrate the complexity of social, economic, and natural system interactions in the marine environment.

MRM 535. RIGHTS-BASED FISHERIES MANAGEMENT (3). Clear, appropriate and enforceable fishing entitlements and responsibilities are a cornerstone of sustainable fisheries management. Rights-based management tools such as dedicated access privileges, community quotas, co-management and cost recovery will be explored as ways of promoting individual and collective responsibility for sustainable fisheries management. High seas fisheries will also be addressed.

MRM 552. MARINE ECONOMICS (3). Economic aspects of marine resource utilization and management will be analyzed. Topics include open access aspect of marine resources; conflict and allocation of marine resources, marine resource markets, marine recreation, pollution, and aquaculture, with special emphasis on commercial fisheries. Offered every fall in odd years. **CROSSLISTED** as AREC 552 **PREREQS:** AREC 351 or AREC 352

MRM 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

■ OCEANOGRAPHY COURSES

OC 103. *EXPLORING THE DEEP: GEOGRAPHY OF THE WORLD'S OCEANS (4). Introduces non-science students to the oceans, including marine geology and chemistry, ocean currents, coastal and biological processes. Field trip required, transportation fee charged. Lec/lab. (Bacc Core Course)

OC 199. SPECIAL TOPICS IN OCEANOGRAPHY (1-4). Introduction to topics of current interest in oceanography for lower-division undergraduates. May be repeated for credit when topic varies. This course is repeatable for a maximum of 99 credits.

OC 201. OCEANOGRAPHY (4). Plate tectonics and the geological structure of ocean basins; physical and chemical properties of seawater; Earth's energy budget; large-scale circulation of the atmosphere and ocean; marine sediment properties and transport; Earth history recorded in marine sediments; the carbon cycle in the atmosphere and sea; and the ecology of pelagic and benthic systems. Lec/lab.

OC 332. COASTAL OCEANOGRAPHY (3). Physics, geology, biology and hydrology of coastal oceans. How coastal waters respond to forcing by heating, cooling, winds, tides, waves, rain, evaporation, river runoff and freezing. Geography and geology of coastlines: erosion and deposition processes, beach dynamics. Coastal equilibrium cells as sources and sinks of sediment. Rocky shore, beach, mudflat, estuarine, and coastal biotic communities; animal migrations. Law of the Sea rights and responsibilities of coastal states. Fisheries and mariculture in coastal seas. Pollution and coastal ocean resources. Using a matrix to define environmental problems; pathways that pollutants take through the coastal ecosystem. Offered annually.

OC 332H. COASTAL OCEANOGRAPHY (3). Physics, geology, biology and hydrology of coastal oceans. How coastal waters respond to forcing by heating, cooling, winds, tides, rain, evaporation, river runoff and freezing. Geography and geology of coastlines: erosion and deposition processes, beach dynamics. Coastal equilibrium cells as sources and sinks of sediment. Rocky shore, beach, mudflat, estuarine, and coastal biotic communities; animal migrations. Law of the Sea rights and responsibilities of coastal states. Fisheries and mariculture in coastal seas. Pollution and coastal ocean resources. Using a matrix to define environmental problems; pathways that pollutants take through the coastal ecosystem. Offered annually. **PREREQS:** Honors College approval required.

OC 333. OCEANS, COASTS, AND PEOPLE (3). Contemporary issues related to human interactions with the oceans and coastal zones, including living and energy resources, geohazards

and impacts of global change. Content presented in lectures, readings and group discussions, with project oral presentations. **PREREQS:** OC 331. A full-year sequence, OC 331, OC 332, OC 333 is recommended but not required.

OC 334. ^POLAR OCEANOGRAPHY (3). Explores the physical, chemical and biological oceanography of the Arctic and Antarctic and examines the impacts of mans' activities both directly through resource utilization, and indirectly through climate change. Introduction to polar oceanography through a series of lectures, interactive classes, written assignments and a case study. (Writing Intensive Course) **PREREQS:** OC 331

OC 399. SPECIAL TOPICS IN OCEANOGRAPHY (1-4).

OC 399H. SPECIAL TOPICS IN OCEANOGRAPHY (1-4).

OC 401. RESEARCH PROJECTS (1-4). Field and laboratory research in oceanography for undergraduates, resulting in a written report. This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor and topic approval required before registration.

OC 403. THESIS (1-16). Independent, original study that culminates in a senior thesis. Faculty sponsor must be prearranged. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** College approval required.

OC 405. READING AND CONFERENCE (1-4). Independent library research and reading in specialized topics in oceanography for undergraduates, guided by discussions in conferences with faculty. A written report may be required. This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor and topic approval required before registration.

OC 407. SEMINAR (1-3). Undergraduate seminar on current developments in the oceanographic research literature, with student presentations and group discussions. A written report may be required. This course is repeatable for a maximum of 16 credits.

OC 407H. SEMINAR (1-3). Undergraduate seminar on current developments in the oceanographic research literature, with student presentations and group discussions. A written report may be required. This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

OC 410. INTERNSHIP (1-16). Pre-career professional experience under joint faculty and employer supervision. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** 12 credits of upper-division college courses and approval required.

OC 430. PRINCIPLES OF PHYSICAL OCEANOGRAPHY (4). Fundamental principles of physical oceanography; conservation of mass, heat, momentum and vorticity; equations governing motion in the ocean; geostrophy; planetary boundary layers; wind-driven and thermohaline circulation. Descriptive oceanography; application of the fundamental principles to the ocean; examination of the major current systems; water mass analysis. Offered annually. **PREREQS:** One year each of college physics and college calculus.

OC 433. COASTAL AND ESTUARINE OCEANOGRAPHY (3). Circulation of the coastal ocean including continental shelf circulation, upwelling, coastal jets, undercurrents, coastal-trapped waves. Fundamentals of surface waves and tides; tsunamis, wind generation, breaking waves. Estuary classification and circulation patterns; shallow-water processes and beach morphology. Offered alternate years. **PREREQS:** One year of college physics and one year of calculus.

OC 440. INTRODUCTION TO BIOLOGICAL OCEANOGRAPHY (3). Introduction to the ocean as an ecosystem, with emphasis on the processes affecting productivity and structure of oceanic communities. Interactions of biological processes with chemical, physical, and geological processes in the ocean. Effects of light and nutrients on phytoplankton, grazing by zooplankton, microbial activity and recycling, distributional patterns of zooplankton and nekton, ecology of benthic animals, marine fisheries, and pollution problems. Offered annually.

OC 450. CHEMICAL OCEANOGRAPHY (3). Chemical properties and processes in the oceans. Composition, origin and evolution of sea water; thermodynamic and kinetic predictions for reactions in sea water; major and minor element reservoirs and fluxes; vertical and horizontal transport of materials; isotopic clocks and tracers; nutrients; chemical processes and fluxes across major marine interfaces, including estuaries, atmosphere, sediments, suspended particles and hydrothermal systems. Offered annually. **PREREQS:** One year of college-level general chemistry.

OC 460. GEOLOGICAL OCEANOGRAPHY (3). Structure of ocean basins, plate tectonics and sea floor spreading, marine sedimentation, history of ocean basins, and analysis of geological and geophysical data. Offered annually. **PREREQS:** One year each of physics and chemistry or science background.

OC 499. SPECIAL TOPICS IN OCEANOGRAPHY (1-4). Subjects of current interest in oceanography, not covered in depth in other courses. May be repeated for credit when topic varies. Graded P/N. This course is repeatable for a maximum of 99 credits. **PREREQS:** Varies with current topic. For upper-division undergraduates.

OC 501. RESEARCH (1-16). Original research work that will not be part of the data used in a thesis. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor approval required.

OC 503. THESIS (1-16). Thesis research and writing. This course is repeatable for a maximum of 999 credits.

OC 505. READING AND CONFERENCE (1-16). Independent reading and library research on specialized topics in oceanography, guided by discussions with supervising faculty. A written report may be required. This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor and topic approval required before registration.

OC 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

OC 507. SEMINAR (1-3). Student presentations and discussions of current research literature or personal research results. Original research presentations by visiting scientists, OSU faculty and graduate students presenting final thesis results. Other sections and specific topics by arrangement. This course is repeatable for a maximum of 16 credits.

OC 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

OC 512 BASIC MATLAB FOR ENVIRONMENTAL SCIENTISTS AND ENGINEERS (2). MATLAB desktop environment will be introduced and basic programming and data analysis skills will be developed, with an emphasis on writing optimized routines to analyze data sets utilizing matrix algebra and vectorization of functions. Basic graphics and visualization will be covered, including two-dimensional and three-dimensional graphing, contouring and movies.

OC 515 OREGON COAST MATH CAMP (3). Selected topics from differential calculus, integral calculus, ordinary and partial differential equations, statistics, linear algebra and vector calculus. Two-week course taught at Hatfield

Marine Science Center in Newport, Oregon, before fall term begins. Graded P/N. **PREREQS:** Differential and integral calculus and linear algebra highly recommended or consent of instructor.

OC 521 APPLICATIONS IN OCEAN ECOLOGY AND BIOGEOCHEMISTRY (4). Methodological underpinnings of marine ecology and biogeochemistry. Students will learn about both new and traditional methods of seawater analysis and biological rate determinations. They will evaluate methods by analyzing observations and samples, and assessing the interpretive effectiveness of approaches. Lec/lab. **PREREQS:** OC 540 **COREQS:** OC 522, OC 523

OC 522. OCEAN BIOGEOCHEMICAL DYNAMICS (4). Examines what keeps ocean systems in balance, and determines their response to perturbation. The course relies on connections between physical transport and biogeochemical reaction rates and energetics, taught from the perspective of key ocean biogeochemical cycles. **PREREQS:** Bachelor's degree in scientific field or consent of instructor. OEB students are required to also take OC 523, Ocean Ecological Dynamics, and OC 521, Applications in Ocean Ecology and Biogeochemistry, as part of first-year Tier Two curriculum. **COREQS:** OC 521, OC 523

OC 528. MICROPROBE ANALYSIS (3). Theory and application of electron microprobe analysis to problems in geology, engineering, chemistry, physics, and biology.

OC 530. PRINCIPLES OF PHYSICAL OCEANOGRAPHY (4). Fundamental principles of physical oceanography; conservation of mass, heat, momentum and vorticity; equations governing motion in the ocean; geostrophy; planetary boundary layers; wind-driven and thermohaline circulation. Descriptive oceanography application of the fundamental principles to the ocean; examination of the major current systems; water mass analysis. Offered annually. **PREREQS:** One year each of college physics and college calculus.

OC 532. AQUATIC CHEMISTRY: NATURAL AND ENGINEERED SYSTEMS (4). Low temperature thermodynamic and selective kinetic treatments primarily of the inorganic chemistry groups, but also organic ligands and surface active groups, of natural and engineered waters; thermodynamic principles and computational techniques for prediction of equilibrium speciation; comparison of predictions to observations; computer laboratory. Lec/rec. **CROSSLISTED** as ENVE 532 **PREREQS:** One year of college-level chemistry (CH 221, CH 222, CH 223 or equivalent), plus a minimum of one year organic or physical chemistry. Recommended corequisites: ENVE 536, Aqueous Environmental Laboratory, and/or OC 652, Chemical Oceanography Laboratory.

OC 533. COASTAL AND ESTUARINE OCEANOGRAPHY (3). Circulation of the coastal ocean including continental shelf circulation, upwelling, coastal jets, undercurrents, coastal-trapped waves. Fundamentals of surface waves and tides; tsunamis, wind generation, breaking waves; shallow-water processes and beach morphology. Offered alternate years. **PREREQS:** One year of college physics and one year of calculus.

OC 540. BIOLOGICAL OCEANOGRAPHY (3). The ocean as an ecosystem, with emphasis on the processes affecting productivity and structure of oceanic communities. Interactions of biological processes with chemical, physical and geological processes in the ocean. Effects of light and nutrients on phytoplankton, grazing by zooplankton, microbial activity and recycling, distributional patterns of zooplankton and nekton, ecology of benthic animals, marine fisheries and pollution problems. Offered annually.

OC 541. MARINE ZOOPLANKTON (4). Small animal life in the sea; population biology, biogeography, migrations, life cycles, physiology.

Role of zooplankton in pelagic ecosystem dynamics is examined through modeling. Offered alternate years. **PREREQS:** OC 540

OC 550. CHEMICAL OCEANOGRAPHY (3). Chemical properties and processes in the oceans. Composition, origin and evolution of sea water; thermodynamic and kinetic predictions for reactions in the sea water; major and minor element reservoirs and fluxes; vertical and horizontal transport of materials; isotopic clocks and tracers; nutrients; chemical processes and fluxes across major marine interfaces, including estuaries, atmosphere, sediments, suspended particles and hydrothermal systems. Offered annually. **PREREQS:** One year of college-level general chemistry.

OC 560. GEOLOGICAL OCEANOGRAPHY (3). Structure of ocean basins, plate tectonics and sea floor spreading, marine sedimentation, history of ocean basins, and analysis of geological and geophysical data. Offered annually. **PREREQS:** One year each of physics and chemistry or science background.

OC 561. IGNEOUS AND TECTONIC PROCESSES IN THE OCEAN (3). An integrated view of the igneous and tectonic processes responsible for the formation and evolution of the ocean basins. The course is organized by tectonic environment including ridge crest, ridge flank, ocean basins, seamounts, and active and passive margins. **PREREQS:** One year each physics, calculus and geology.

OC 562. SEDIMENTARY PROCESSES IN THE OCEAN BASINS (3). An integrated view of sediment processes in the ocean basins from a source to sink perspective, with a special emphasis on the interpretation of the historical record. **PREREQS:** OC 550 and one year each physics and calculus and geology.

OC 574. EARLY LIFE HISTORY OF FISHES (4). Overview of diversity of development patterns in fishes; emphasis on morphology, life history, and evolution. Offered alternate years. **CROSSLISTED** as FW 574. **PREREQS:** FW 315 or equivalent.

OC 599. SPECIAL TOPICS IN OCEANOGRAPHY (1-4). Subjects of current interest in oceanography, not covered in depth in other courses. May be repeated for credit when topic varies. This course is repeatable for a maximum of 16 credits. **PREREQS:** Varies with current topic.

OC 601. RESEARCH (1-16). Original research work that will not be part of the data used in a thesis. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor approval required.

OC 603. THESIS (1-16). Thesis research and writing. This course is repeatable for a maximum of 999 credits.

OC 605. READING AND CONFERENCE (1-16). Independent reading and library research on specialized topics in oceanography, guided by discussions with supervising faculty. A written report may be required. This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor and topic approval required before registration.

OC 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

OC 607. SEMINAR (1-3). Student presentations and discussion of current research literature or personal research results. Original research presentations by visiting scientists, OSU faculty and graduate students presenting final thesis results. Other sections and specific topics by arrangement. This course is repeatable for a maximum of 16 credits.

OC 608. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

OC 630. OCEAN WAVE MECHANICS I (3). Linear wave boundary value problem formulation and solution, water particle kinematics, shoaling,

refraction, diffraction, and reflection. Linear long wave theory with applications to tides, seiche, and storm surge. CROSSLISTED as CE 630. Lec/lab.

OC 631. OCEAN WAVE MECHANICS II (3). Second in the sequence of ocean engineering wave mechanics, covers the following topics: introduction to long wave theory, wave superposition, wave height distribution, and the wind-wave spectrum, introduction to wave forces, and basic nonlinear properties of water waves. May include additional selected topic in wave mechanics. CROSSLISTED as CE 631. **PREREQS:** (CE 630 or OC 630)

OC 634. LONG WAVE MECHANICS (3). Theory of long waves. Depth-integrated Euler's equation and its jump conditions. Evolution equations and their solutions. Nonlinear shallow-water waves, the Korteweg-deVries equation and Boussinesq equation. Boundary-layer effects. Shallow-water waves on beaches. Applications of the fundamentals to problems of tsunamis. CROSSLISTED as CE 634. **PREREQS:** (OC 630 and CE 631) and OC 670 or equivalent.

OC 635. APPLIED MODELING OF NEARSHORE PROCESSES (4). An introduction to numerical modeling of the nearshore ocean, providing hands-on experience with state-of-the-art numerical models for wave propagation, nearshore circulation, planform shoreline evolution and bathymetric profile evolution. Focuses on review of model requirements, detailed study of several specific models for several domains of interest, application to coastal phenomena, interpretation of model results. Lec/lab. Offered alternate years. CROSSLISTED as CE 635.

OC 644. MARINE PHYTOPLANKTON ECOLOGY (4). Ecology of photosynthetic plankton in the oceans; autotrophic, heterotrophic, and mixotrophic nutrition; limitation of growth and photosynthesis by light, nutrients and trace elements; grazing and other removal processes; primary productivity and its control in major ocean provinces and the global ocean; role of the marine phytoplankton in the global carbon balance on time scales ranging from seasonal to glacial/interglacial. Offered alternate years. **PREREQS:** OC 540 and/or two years of biology.

OC 646. PHYSICAL/BIOLOGICAL INTERACTIONS IN THE UPPER OCEAN (4). Variability in physical oceanic processes in the upper ocean and relationship to spatial and temporal variations in biomass, growth rates, and other biological patterns in the organisms of ocean surface waters. The relationship between variability in ocean physical phenomena and ecosystem dynamics, including the requirements of sampling design for upper ocean ecological studies. Time and space scales of physical and biological phenomena in the upper ocean. Offered alternate years. Offered alternate years, typically fall term. **PREREQS:** (OEAS 530 and OEAS 540) and/or instructor approval required.

OC 647. MARINE MICROBIAL PROCESSES (4). Roles of prokaryotic and eukaryotic microbes in the biological and chemical processes of the sea, with emphasis on pelagic ecosystems. Functional and taxonomic types and distribution of marine micro-organisms. Biochemical and physiological processes of major groups of microbes as these relate to geochemical cycles of biologically active elements in the sea. Heterotrophic and mixotrophic protists in pelagic foodwebs. Discussion of current experimental approaches to determining aspects of microbial activity and production. Offered alternate years. **PREREQS:** OC 540 and two years of biology or instructor approval required.

OC 648. MARINE BENTHIC ECOLOGY (4). Differences between benthic and water-column biological oceanography. Historical, observational approaches including sedimentology, fluid mechanics and geochemistry. **PREREQS:** OC 540 and two years of biology or instructor approval required.

OC 649. SPECIAL TOPICS IN BIOLOGICAL OCEANOGRAPHY (1-4). Special topics of current interest in biological oceanography not covered in detail in other courses. May be repeated for credit when topic varies. This course is repeatable for a maximum of 16 credits.

OC 651. ADVANCED CHEMICAL OCEANOGRAPHY (3). Advanced topics in chemical oceanography emphasizing problems and issues of contemporary interest. Descriptive studies of chemical properties and processes in sea water and the oceans; interactions of oceanic circulation and chemical distributions; sea water chemistry in specialized environments; geochemical and biochemical cycles; sea water-sediment interactions; analytical chemical advances. **PREREQS:** OC 550

OC 652. CHEMICAL OCEANOGRAPHY LABORATORY (3). Chemical analytical techniques for seawater and marine sediments. Topics include: salinity; dissolved oxygen; nutrients; the CO₂ system; dissolved and particulate organic materials; trace metals; radionuclides; analytical barriers and recent advances. **PREREQS:** OC 550 and/or instructor approval required.

OC 653. MARINE RADIOCHEMISTRY (3). Basic principles of radioactive decay and growth; marine biogeochemistry of uranium and thorium series radionuclides; release of artificial radionuclides into marine environments; applications of radioisotope techniques to oceanic circulation and mixing, paleoceanography, sediment geochronology, archeometry, and marine pollution. **PREREQS:** OC 550

OC 654. MARINE POLLUTION (3). Identification of sources for organic and inorganic pollutants in estuarine, coastal and oceanic environments; mechanisms of introduction and dispersal; chemical and biological behavior and removal processes; regional and global scale effects; case studies and future research strategies; monitoring programs for pollution assessment. Offered alternate years. **PREREQS:** OC 550

OC 657. SEDIMENT BIOGEOCHEMISTRY (3). An overview of early diagenetic processes in marine sediments and the interdisciplinary approaches used to quantify material transformations at the seafloor. **PREREQS:** OC 550 is recommended.

OC 659. SPECIAL TOPICS IN CHEMICAL OCEANOGRAPHY (1-4). Special topics of current interest in chemical oceanography not covered in detail in other courses. May be repeated for credit when topic varies. This course is repeatable for a maximum of 16 credits.

OC 660. PALEOCEANOGRAPHY (3). Large-scale changes in the oceanic and atmospheric system, as recorded in marine sediments, and their implications for understanding global environment changes. Chemical, physical, and biological proxies for oceanic and atmospheric processes in the geologic record period. Evidence for changing global climate at time scales longer than the historical record; the oceanic history of the Late-Cenozoic ice ages, long term evolution of climate change patterns, catastrophic global environmental events, and application of quantitative models to the past. Current research topics in paleoceanography. Offered alternate years. **PREREQS:** OC 560 or instructor approval required.

OC 661. PLATE TECTONICS AND STRUCTURE OF OCEAN BASINS (3). Evidence and predictions of plate tectonic model; structure and evolution of divergent and convergent plate margins; petrology of oceanic crust and upper mantle; lithosphere-mantle interaction; evolution of oceanic lithosphere; models for development of continental margins. Offered alternate years. **PREREQS:** One year each of physics, calculus, and geology.

OC 663. GEOCHEMISTRY OF DEEP-SEA SEDIMENT RECORD (3). Nature and distribution of deep-sea deposits; factors controlling the distribution of terrigenous, volcanic, biogenic, and authigenic components; diagenesis and redistribution at the ocean floor.

OC 664. NEARSHORE SEDIMENT TRANSPORT (3). To study the dynamics of a nearshore wave field propagating over a shoaling bathymetry, the response of sediments and morphology to those motions, emergent morphology due to the coupled system, anthropogenic influences and mitigation. **PREREQS:** General physics, integral and differential calculus; nearshore hydrodynamics.

OC 665. APPLIED GEOSTATISTICS (4). Spatial and stratigraphic characteristics of geologic data; geologic data bases; application of matrix theory to the solution of geologic problems; descriptive models, predictive models, spatial models, and stratigraphic and time-series models. Offered alternate years. **PREREQS:** One year of statistics and one year of computer science.

OC 666. ISOTOPIC MARINE GEOCHEMISTRY (3). Radiogenic and light stable isotopes and application to composition and evolution of the suboceanic mantle, petrogenesis of the oceanic crust, sediment provenance and sedimentary processes, geochronology, seawater chemical dynamics and paleoclimatology. Offered alternate years.

OC 667. IGNEOUS PROCESSES IN THE OCEAN BASINS (3). Origin and evolution of oceanic crust including the origin and nature of chemical heterogeneity and igneous rocks in the ocean basins; interaction of mantle and lithosphere as reflected in the topography of ocean basins; hydrothermal processes and the alteration of oceanic crust; geothermometry and geobarometry of oceanic magmas; elementary fractionation patterns and modeling of partial melting; fractional crystallization in oceanic magmas. Offered alternate years.

OC 668. THEORETICAL PETROLOGY (3). Theoretical aspects of igneous petrology in marine petrochemical processes. Igneous and metamorphic geology; hydrothermal solutions. Principles of energy, enthalpy, entropy. Equilibrium processes of melting, crystallization, mineral chemistry, geothermometers, geobarometers. Offered alternate years. **PREREQS:** Petrology.

OC 669. SPECIAL TOPICS IN GEOLOGICAL OCEANOGRAPHY (1-4). Subjects of current interest in geological oceanography not covered in depth in other courses. May be repeated for credit when topic varies. This course is repeatable for a maximum of 16 credits.

OC 670. FLUID DYNAMICS (4). Fundamentals of fluid dynamics: conservation laws of mass, momentum, and energy; inviscid and viscous flows; boundary layers; vorticity dynamics; irrotational and potential flow. Offered annually. **PREREQS:** One year of college physics; mathematics through differential equations and vector calculus.

OC 671. GEOPHYSICAL FLUID DYNAMICS (4). Dynamics of rotating and stratified fluids, potential vorticity, geostrophic motion; inviscid shallow-water theory, Poincare, Kelvin, and Rossby waves; geostrophic adjustment, quasigeostrophic approximation, Ekman layers, two-layer and continuously stratified models. Offered annually. **PREREQS:** OC 670

OC 672. THEORY OF OCEAN CIRCULATION (4). Theory of steady and time-dependent large-scale circulation in ocean basins. Effects of earth's curvature: the beta-plane approximation. The wind-driven Sverdrup circulation, western boundary currents, eastern boundary upwelling; the effects of friction. Linear theory and nonlinear theory; inertial gyres. Effects of buoyancy forcing; heating, cooling, evaporation, precipitation; density stratification. Wind- and buoyancy-forced circulation in the thermocline; ventilation. Potential

vorticity conservation and homogenization. Offered annually. **PREREQS:** (OC 670 and OC 671)

OC 673. DESCRIPTIVE PHYSICAL OCEANOGRAPHY (4). Fundamental mass, force, and energy balances of the ocean; geostrophy; planetary boundary layers; wind-driven and thermohaline circulation; vorticity; air-sea fluxes of heat, salt, moisture and momentum. Application of these balances through descriptive examination of the ocean-global heat budget; surface current systems; abyssal circulation. Study of variability on a variety of time and space scales. Instrumentation and platforms used for observing the ocean. Offered annually. **PREREQS:** (OC 530 or OC 670 or ATS 515)

OC 674. TURBULENCE (4). Governing equations, turbulent kinetic energy, vorticity dynamics; turbulent transports of mass and momentum; statistical description of turbulent flows, spectral dynamics; turbulent boundary layers, planetary boundary layers in the atmosphere and ocean, convective mixed layers, stable boundary layers; deep ocean turbulence. Offered alternate years. **PREREQS:** OC 670

OC 675. NUMERICAL MODELING IN OCEAN CIRCULATION (4). Review of theoretical models of ocean circulation, including shallow water, barotropic, quasigeostrophic, and primitive equation models; adjustment times, internal length and time scales; the role of advection, bathymetry, and coastlines; global models, basin models, regional models and models of jets, eddies and boundary currents. Review of numerical techniques and problems specific to ocean modeling. Local facilities are used to develop models on remote supercomputers. **PREREQS:** (OC 670 and MTH 625 and MTH 626) and /or equivalent and a working knowledge of FORTRAN.

OC 676. INVERSE MODELING AND DATA ASSIMILATION (4). Survey of methods for combining oceanographic observations and observing systems with numerical models of ocean circulation. Topics include: finite-dimensional least squares theory with inequality constraints; optimal interpolation; the representation theory of smoothing; the Kalman smoother and filter; gradient descent methods for minimization; spatial and temporal regularity of filters and smoothers; linear theory of array design; nonlinear optimization, practical assimilation methods. **PREREQS:** Strong background in linear algebra and advanced calculus, geophysical fluid dynamics, numerical modeling of ocean circulation.

OC 678. OCEAN REMOTE SENSING (4). Theory and applications of satellite remote sensing observations of the ocean with emphasis on strengths and limitations in the measurements. Topics include review of electricity and magnetism, absorption and scattering in the atmosphere (radiative transfer), satellite orbital mechanics, measurements of ocean color, infrared remote sensing, microwave radiometry, scatterometry, and satellite altimetry. Offered alternate years. **PREREQS:** MTH 252 and PH 212

OC 679. SPECIAL TOPICS IN PHYSICAL OCEANOGRAPHY (1-4). Subjects of current interest in physical oceanography, not covered in depth in other courses. May be repeated for credit when topic varies. This course is repeatable for a maximum of 16 credits.

OC 680. STABILITY OF GEOPHYSICAL FLUID FLOWS (4). Linear perturbation analysis applied to geophysical flows. These methods provide both quantitative and conceptual insight into the formative stages of turbulent flow. Emphasis is on practical numerical methods for the solution of differential eigenvalue problems. Examples are drawn from a wide range of geophysical flow instabilities, based in part upon student interests. **PREREQS:** OC 670 and COREQ: OC 670 and multivariate calculus, matrix calculus, matlab.

OC 681. GEOPHYSICAL WAVES (4). Fundamentals of wave dynamics applied to geophysical fluids. Hyperbolic waves--linear and nonlinear; characteristics; shock waves. Dispersive waves--linear waves, dispersion relations, group velocity; isotropic and anisotropic dispersion; nonlinear solitary waves. Application to geophysical waves--surface gravity, capillary, internal gravity, Kelvin, planetary, coastal. Offered alternate years. **PREREQS:** OC 670

OC 682. DATA ANALYSIS IN THE TIME AND SPACE DOMAINS (4). Theory of classical and modern techniques for analysis of data in the time and space domains with applications to real oceanographic and atmospheric data. Topics include correlation analysis, regression analysis, EOF analysis, objective mapping, interpolation, filtering, sampling errors, and confidence tests. Offered alternate years. **PREREQS:** MTH 341 and MTH 342 and MTH 418 and OC 608 and ST 314 and a working knowledge of Matlab, IDL, or FORTRAN, or consent of instructor.

OC 683. DATA ANALYSIS IN THE FREQUENCY AND WAVE NUMBER DOMAINS (4). Theory of classical and modern techniques for analysis of data in the frequency and wavenumber domains with applications to real oceanographic and atmospheric data. Topics include sampling theory, one-dimensional autospectral analysis, multidimensional autospectral analysis, coherence and phase analysis, bi-spectral analysis, wavelet analysis, and confidence tests. Offered alternate years. **PREREQS:** MTH 341 and MTH 342 and MTH 418 and OC 608 and ST 314 and a working knowledge of Matlab, IDL, or FORTRAN, or consent of instructor.

OC 691. PROPOSAL WRITING (3). Teaches the use of NSF Fastlane. Includes a discussion of ethics and fairness in reviewing, a review of real proposals by faculty, a simulated NSF funding panel, and then development of a real proposal, for review purposes. This will relate directly to the student's current thesis or project. The course enables graduate students from all disciplines to develop rigorous, well thought-out proposals. It should be taken early enough in the program so that the proposal process contributes to their research progress.

OC 808. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

■ OCEAN, EARTH, AND ATMOSPHERIC SCIENCES COURSES

OEAS 500. CASCADIA FIELD TRIP (2-4). A field course to various locations within the Cascade volcanic arc, Coast Range and Oregon Coast. Introduction to the range of physical and biological science topics to be covered in OEAS 520, OEAS 530 and OEAS 540 in field settings; the linkages between these topics, and their impact on humans, with case examples. Students will practice math skills, and collect samples and data to be used in laboratory sessions in the later courses. Offered annually. Transportation fee charged. Graded P/N.

OEAS 520. THE SOLID EARTH (4). Movement of mass and energy within the Earth and into/out of its outer surface, expressed as plate tectonics, earthquakes, heat flow, volcanoes, geomagnetic field; composition, structure, hydrology and aging of ocean crust; lithosphere creation, recycling and mantle overturn. Marine sedimentation, sources and transport, continental weathering, tectonics-climate interactions, glacial history and sea level response. Geohazards, storm events, beach and estuary processes. Offered annually. Lec/lab. **PREREQS:** One year each of physics, chemistry, calculus, or instructor permission.

OEAS 530. THE FLUID EARTH (4). Fundamental principles of fluid circulation in the atmosphere and ocean. Atmospheric chemistry, radiation, thermodynamics, and dynamics. Conservation of

mass, heat, momentum and vorticity in the ocean; equations governing motion; geostrophy; planetary boundary layers; wind-driven and thermohaline circulation. Air-sea fluxes and global circulation models; climate change. Offered annually. Lec/lab. **PREREQS:** One year each of physics, chemistry, calculus, or science background and permission of instructor; field course.

OEAS 540. THE BIOGEOCHEMICAL EARTH (4). Integrating fundamental concepts in biological and chemical oceanography to understand energy and material transformations in estuarine, coastal and open ocean habitats. Topics include structure and function of marine ecosystems, biogeochemical cycles, and human impacts. Offered annually. Lec/lab. **PREREQS:** One year of physics, chemistry, and calculus, or instructor permission.

The College of Education develops multiculturally competent researchers, scholars, learning leaders and practitioners who make a difference by promoting innovation, social justice, and lifelong learning with a focus on STEM and cultural and linguistic diversity. Our research and professional preparation fosters scholarship, intellectual stimulation, openness, flexibility, and a sense of community.

The College of Education offers an undergraduate Education Double Degree and graduate degrees and programs to prepare teachers, counselor educators, and other educational professionals for careers in schools, community colleges, business and industry, and other postsecondary settings. In addition, there are electives for undergraduate students who wish to explore education as a career choice.

All programs reflect research-based approaches to education and counseling developed by university faculty, kindergarten through adult teachers and administrators, counselors and leaders from business and industry. Students gain experience through extensive internships in their field of study.

AUTHORIZATION AND ACCREDITATION

The College of Education is authorized by the State Board of Higher Education to offer teacher education and counseling programs and by the Oregon Teacher Standards and Practices Commission (TSPC) to recommend teacher and counselor candidates for initial, standard, and continuing licensure.

All teacher education programs are fully accredited by the National Council for Accreditation of Teacher Education (NCATE) and by the Oregon Teacher Standards and Practices Commission. Counselor education programs are fully accredited by Council for Accreditation of Counseling and Related Educational Programs (CACREP).

Applicants for teacher and counselor licensure must meet TSPC requirements in effect at the time of admission to a licensure program. **Licensure rules are regulated by TSPC and may change. Students should consult regularly with their advisor.**

ADVISING

Early and continuous advising is an important aspect of an education in both the undergraduate and graduate programs in the College of Education. Students pursuing an undergraduate degree shall meet with a professional academic advisor in the centralized advising office, while graduate students shall be assigned a faculty advisor. Undergraduates pursuing the undergraduate Double Degree in Teacher Education K-12 are urged to declare their interest immediately in order to work for the 3.0 GPA entry requirement and to graduate in a timely manner. It is important for undergraduates to work concurrently with both the College of Education academic advisor and the academic advisor for their primary degree to ensure knowledge of academic progress, degree requirements, and educational opportunities in their chosen field.

SCHOLARSHIPS

The College of Education offers a variety of scholarships and fellowships to deserving students. A listing of the many opportunities can be found at <http://education.oregonstate.edu/education-scholarships-and-fellowships>. Students who have declared their major in education are sent an email application to consider applying during winter term each year. Additional state and private scholarship information is available at the OSU Office of Financial Aid and Scholarships.

UNDERGRADUATE EDUCATION DOUBLE DEGREE

Liz White is the Double Degree program coordinator, 541-737-8583, liz.white@oregonstate.edu.

SCIENCE EDUCATION AND MATHEMATICS EDUCATION

Science and mathematics education provides a rich and stimulating graduate experience designed to prepare future learning leaders and support efforts to build sustainable communities through lifelong learning in science and mathematics. The faculty brings broad experience in facilitating learning at the elementary through college levels, in free-choice learning environments, and in private business and industry. The faculty actively strive to generate an atmosphere of scholarship that blend ideas from a variety of fields including the science and mathematics disciplines represented within the College of Science, psychology, sociology, anthropology, history of science, cognitive science, and education.

The program supports a colloquium series that introduces students and faculty to visiting scholars, innovative programs on and off campus and faculty and graduate student research. Various forms of assistance are available to qualified students through teaching in the professional teacher licensure program, work on externally funded research and evaluation projects, or teaching in other departments in the university. The master's programs can be completed with a thesis or non-thesis option. The program requires a comprehensive written qualifying examination as part of the advancement to candidacy in the PhD program. Doctoral students must complete a dissertation of original research.

FACULTY

Professors Bell, Casbon, Dierking, Engle, Falk, Flick, Ng, Russ-Eft, Stern

Associate Professors Bouwma-Gearhart, Dykeman, Elliot, Rubel, Winograd

Assistant Professors Aaron, Arellano, Bottoms, Ciechanowski, Cowin, Giamellaro, Herrera, Johnson, Rowe, Stroud, Thompson, Weber

Instructors Adams, Aduviri, Bachman,

104 Joyce Collin
Furman Hall
Oregon State University
Corvallis, OR
97331-3502
541-737-4661
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Beckett, Beedlow, Biles, Blackman, Bouwma, Buhrlé, Corliss, Cornwall, Dubkin-Lee, Gunn, Helback, Lee, Nyman, M. O'Malley, N. O'Malley, Platt, Reid-Metoyer, Robertson, Scheuermann, L. White, Williams, Wright

EMERITUS FACULTY

Cohen, Eakin, Enochs, Erickson, Higgins, Moule, Niess, Sanchez, Ward

ADJUNCT FACULTY

Eric Alexander, Tracey Bently-Townlin, Bruce Clemetsen, Joseph Cone, Wayne Courtney, Thomas Dick, Kathryn Dins, Molly Engle, Robert Kerr, Tom Kirch, David Kovac, Jeff Malone, Christian Matheis, Leslee Mayers, Kim McAloney, Victoria Nguyen, Janet Nishihara, Michael Olson, Shannon Quihuiz, Larry Roper, Olga Rowe, Ruth Sterner, Christopher Van Drimmelen, Marianne Vydra, Huey Wilson, Kristen Winter, Melissa Yamamoto

Undergraduate Major Education (BA, BS, HBA, HBS)

Graduate Majors

Adult Education (EdM, MAIS)

Graduate Areas of Concentration

*Organization development and training
Work force development
Workplace and adult skills development*

College Student Services Administration (EdM, MS)

Graduate Areas of Concentration

*College and university characteristics and environments
History, development, and current issues in higher education
Leadership and management of administrative departments
Program oversight in specialized administrative areas such as financial aid, student activities, career services, multicultural affairs, recreational sports, and student housing
Student development theory and application*

Counseling (MS, PhD)

Graduate Areas of Concentration

*Clinical mental health counseling (MS only)
Counseling (PhD only)
School counseling (MS only)*

Graduate Options

*Clinical Mental Health Counseling
School Counseling*

Education (**EdD, EdM, MAIS, MS, **PhD)

Graduate Areas of Concentration

*Community college leadership (EdD, PhD)
Elementary, middle, and secondary education (EdM)*

Mathematics Education (MA, MS, PhD)

Graduate Areas of Concentration

Elementary School Mathematics

Free-choice Learning

Mathematics Education

Middle School Mathematics

Secondary Mathematics

Science Education (MA, MS, PhD)

Graduate Areas of Concentration

Elementary School Science

Free-choice Learning

Middle School Science

Science Education

Secondary Science

Teaching: Advanced Mathematics Education (MAT) or Mathematics Education (MS)

Teaching: Agricultural Education (MAT)

Teaching: Biology Education *(MAT) or Science Education (MS)

Teaching: Chemistry Education *(MAT) or Science Education (MS)

Teaching: Elementary Education (MAT)

Teaching: Family and Consumer Sciences Education (MAT)

Teaching: Integrated Science Education *(MAT) or Science Education (MS)

Teaching: Language Arts Education (MAT)

Graduate Option

Social Studies

Teaching: Music Education (MAT)

Teaching: Physics Education *(MAT) or Science Education (MS)

Teaching: Spanish Education *(MAT)

**Not admitting students at this time.*

***See program information.*

Graduate Minors

Adult Education

Graduate Areas of Concentration

Organization development and training, work force development, workplace and adult skills development

Counseling

Education

Mathematics Education

Graduate Areas of Concentration

Elementary school science, free-choice learning, middle school science, science education, secondary science

Science Education

Graduate Areas of Concentration

Elementary school science, free-choice learning, middle school science, science education, secondary science

Undergraduate and Graduate Authorization and Endorsement Areas

Advanced Mathematics

Agricultural Science and Technology

Biology Education

Chemistry Education

Counseling, Track I

Counseling, Track II

Early Childhood Teacher Education

Elementary Education

ESOL/Bilingual

Family and Consumer Science

French Language

German

Health Education

Integrated Science Education

Junior High/Middle School

Language Arts Education

Mathematics, Basic

Music Education

Physical Education

Physical Education, Adapted

Physics Education

Reading

Secondary Teacher Education

Social Science Education

Spanish Language

The Teacher Standards and Practices Commission (TSPC) listing of endorsements that OSU is authorized to approve is at http://www.tspc.state.or.us/program_list.asp.

CAREERS IN SCIENCE AND MATHEMATICS EDUCATION

The master's and PhD programs in Science Education and Mathematics Education provide a gateway to a variety of interesting educational careers. As future learning leaders with a school-based master's degree, students may choose to teach in classrooms at the elementary through secondary level, as an elementary or secondary curriculum specialist or department head, or in another supervisory or research-oriented position. With an area of concentration in free-choice learning students may become educators or managers in such settings as national parks, nature centers, zoos, aquariums, museums, public broadcasting or media.

A PhD in school-based education enables students to become college educators focused on teacher preparation research or researcher/evaluators in not-for-profit/for profit organizations or other settings. A PhD with a collegiate focus, prepares students to become university/community college educators focused on university teaching and research, or educational trainers in science or mathematics education in business/industry or researcher/evaluators in not-for-profit/for profit organizations or other settings. The free-choice learning focus will prepare students to be a future learning researcher/evaluator in a university or free-choice learning environment or a director/administrator.

UNDERGRADUATE MAJOR**EDUCATION (BA, BS, HBA, HBS)
(Double Degree)**

The undergraduate Education Double Degree program enables students to earn two undergraduate degrees concurrently—one in their chosen field and the second in Education (BA or BS degree). The Education Double Degree in teacher education is an undergraduate pathway to teacher preparation available to all OSU students. The BA/BS in Education can only be obtained in conjunction with a BA/BS in a student's chosen field.

The Double Degree Program in teacher education comprises 40 credits, done in the academic year after completion of a first degree. This program includes all the course work and field experiences (e.g., student teaching) necessary to qualify for an Oregon Initial 1 Teaching License granted by the Teacher Standards and Practices Commission (TSPC).

The Double Degree program has two stages. The first stage, Pre-Education, allows students to take foundational education courses and required content specific classes without prerequisites. These classes can meet baccalaureate core requirements and elective credits. The second stage, Professional Level, consists of 40 credits focusing on a particular authorization level. The Professional Level includes pedagogy classes and student teaching. Students earn their second degree (Education BS/BA) and simultaneously earn an Oregon Initial 1 Teaching License in their chosen authorization level.

First-years, sophomores, juniors, and seniors may enroll in one or more of the pre-education courses at any time during any year of their studies. There are no initial prerequisites for these courses and they may help students decide whether teaching is right for them. To enter the Professional Level of the Double Degree students need to have completed required course work, pass a basic skills test in reading, writing, and mathematics, and pass the Civil Rights in the Educational Environment Exam. The full application information is on the College of Education website. It is strongly recommended that students meet with the College of Education Double Degree advisor early in the Pre-Education level and at least a year prior to their application to the Professional Level.

Allyson Dean is the Double Degree program advisor, 541-737-4661, allyson.dean@oregonstate.edu.

Admission to the Professional Level of the Education Double Degree Program is required in the spring of the year prior to beginning the final cohort year of pedagogy classes and student teaching.

Applications and requirements are available on the College of Education website at <http://oregonstate.edu/education/doubledegree/>.

Students select one of four areas (authorization levels):

1. Early childhood education (age 3 through grade 4)
2. Elementary education (grades 3–8 in the self-contained setting)
3. Middle school (grades 5–9)
4. High school (grade 9–12)

The following subject areas (endorsements) are available with the secondary (middle and high school) authorizations:

- Family and Consumer Science
 - Foreign Languages (French, German, Spanish)
 - Health Education
 - Language Arts (English) Education
 - Mathematics (Basic Mathematics)
 - Mathematics (Advanced Mathematics)
 - Science (Biology Education, Chemistry Education, Integrated Science Education, Physics Education)
 - Social Science Education
- Early childhood and Elementary authorizations will have a Multiple Subjects Endorsement.

**EDUCATION (DOUBLE DEGREE)
K-12 CLASSROOMS PATHWAY****Level I: Pre-Education**

Classes Required for Admission to Professional Level—these classes can be taken any time prior to application to Level II.

- TCE 216. *Purpose, Structure, and Function of Education in a Democracy (3)
TCE 219. Civil Rights and Multicultural Issues in Education (3)
TCE 253. Learning Across the Lifespan (3)+
TCE 309. Field Practicum (3)
or TCE 409 Practicum/Clinical Experience (3)
TCE 472. Foundations of ESOL/Bilingual Education (3)
TCE 479. Linguistics for ESOL/Bilingual Teachers (3)
Completion of First Degree
Content Specific Courses for Subject Area Teaching (Content Mastery Forms are available on the College of Education website or in the Student Services Office in Furman Hall.)

Level II: Professional Level Admission (Cohort Year)

Application is due April 1, the spring before beginning cohort year.

Early Childhood/Elementary Authorizations**Fall Term**

- SED 459. Science and the Nature of Inquiry (3)
TCE 340. ^Supportive Differentiated Environments (3)
TCE 409. Practicum/Clinical Experience (3)

- TCE 410. Internship/Work Experience (2)
TCE 457. Teaching Elementary Mathematics for Understanding (3)

Winter Term

- TCE 407. Seminar (2)
TCE 410. Internship/Work Experience (2)
TCE 456. Strategies for Teaching Language Arts and Social Studies (2)
TCE 473. Instructional Approaches for ESOL/Bilingual Education (3) [**Pending approval**]
TCE 483. Developmental Reading (3)

Spring Term

- TCE 410. Internship/Work Experience (10)
TCE 424. Teacher as Reflective Practitioner (2)

**MIDDLE/HIGH SCHOOL
AUTHORIZATIONS****Fall Term**

- TCE 340. ^Supportive Differentiated Environments (3)
TCE 409. Practicum/Clinical Experience (3)
TCE 410. Internship/Work Experience (2)
TCE 412. Learning Styles and Needs in Adolescence (2)
TCE 491 Content Standards and Curriculum Development for Mid Level 9 (3)
or TCE 494 Content Standards and Curriculum Development for High School (3)
or SED 473 Science Pedagogy and Technology I (4) [**Pending approval**]
or SED 474 Mathematics Pedagogy and Technology I (4) [**Pending approval**]
or LING 499 Special Topics (4)[*Depending on teaching discipline*]

Winter Term

- TCE 407. Seminar (1)
TCE 410. Internship/Work Experience (2)
TCE 425. Curriculum Implementation and Instructional Strategies 7–12 (4)
or SED 476 Science Pedagogy and Technology II [**Pending submission and approval of a proposal**]
or SED 477 Mathematics Pedagogy and Technology II (4)[**Pending submission and approval of a proposal**]
[*Depending on teaching discipline*]
TCE 427. Alternative Assessment for Middle and High School Teaching (2)
TCE 493. Reading, Literature, and Language Development in the Content (2)
or TCE 473. Instructional Approaches for ESOL/Bilingual Education (3) [**Pending approval**]

Spring Term

- TCE 410. Internship/Work Experience (10)
TCE 424. Teacher as Reflective Practitioner (2)

Footnotes:

- + If you have taken HDFS 211/311, 313, 314 and have a 3.0 GPA or higher, you do not need to take TCE 253.
With junior or senior standing
* Baccalaureate Core Course
^ Writing Intensive Course (WIC)

GRADUATE MAJORS

ADULT EDUCATION (EdM, MAIS)

Graduate Areas of Concentration
Organization development and training, work force development, workplace and adult skills development

The EdM in Adult Education degree prepares adult education specialists for the following roles:

Role #1 Instructional Leader

Role Description: Applies contemporary theories of adult learning and development to determine appropriate ways to respond to the needs of adult learners.

Applicable Courses:

AHE 510. Internship (1–18)
AHE 547. Instructional Strategies for Adult Learners (4)
AHE 553. Adult Learning and Development (4)

Role #2 Instructional System Designer

Role Description: Designs and evaluates outcomes-based learning systems, tools, and media that meet identified needs of adult learners.

Applicable Courses:

AHE 510. Internship (1–18)
AHE 531. Instructional Systems Design I (4)
AHE 532. Instructional Systems Design II (4)
AHE 539. Designing Training Documentation (4)
AHE 547. Instructional Strategies for Adult Learners (4)
AHE 553. Adult Learning and Development (4)

Role #3 Organizational Leader

Role Description: Promotes the transformation of traditional organizations into participative learning organizations.

Applicable Courses:

AHE 510. Internship (1–18)
AHE 534. Organizations and Systems Theory (4)
AHE 567. Leadership Development and Human Relations (4)

Role #4 Action Researcher

Role Description: Systematically inquires into, improves, and reports on own professional practice, and disseminates new insights into the field of adult education.

Applicable Courses:

AHE 510. Internship (1–18)
AHE 532. Instructional Systems Design II (4)
AHE 533. Needs Assessment and Research (4)
AHE 547. Instructional Strategies for Adult Learners (4)

Role #5 Instructional Technology Leader

Role Description: Identifies and selects appropriate technologies to assist in the learning and development of organizational processes of institutional settings.

Applicable Courses:

AHE 510. Internship (1–18)
AHE 539. Designing Training Documentation (4)
AHE 547. Instructional Strategies for Adult Learners (4)
AHE 553. Adult Learning and Development (4)
AHE 522–525. Instructional Technology I–IV (1,1,1,1)

Degree Requirements

The EdM in Adult Education degree requires a minimum of 45 credits beyond the baccalaureate degree to complete the program.

Admission

Admission is selective and competitive. Factors considered in making admission decisions include: completion of a bachelor's degree, cumulative grade-point average (3.00 in the last 90 graded credits of the bachelor's degree and all postbaccalaureate course work), written and oral communication skills, career objectives and commitment, career experience, and professional references.

Applicants submit a letter of intent, résumé, transcripts, three letters of recommendation, writing sample, and application questionnaire. Following an initial screening, applicants may be interviewed by a member of the faculty by telephone or in person.

COLLEGE STUDENT SERVICES ADMINISTRATION (EDM, MS)

Graduate Areas of Concentration

College and university characteristics and environments; history, development, and current issues in higher education; leadership and management of administrative departments; program oversight in specialized administrative areas such as financial aid, student activities, career services, multicultural affairs, recreational sports, and student housing; student development theory and application

The College Student Services Administration program offers preparation in the organization, leadership and administration of programs, services, and facilities in postsecondary education, including college union/centers, recreational sports, student government and activities, residence life programs, student housing, financial aid, career services, and general student advising and academic support.

The MS and EdM degrees are offered with a major in CSSA. One year of full-time work experience is recommended for admission. Please refer to the program Web page for specific application deadline dates for fall admission.

Paid assistantships are an important part of the curriculum and the total learning experience. They are strongly encouraged, but not guaranteed, for all full-time master's students.

For more information, access the college's website <http://oregonstate.edu/dept/cssa/> or write CSSA Graduate Program, College of Education, 104 Joyce Collins Furman Hall, Corvallis, OR 97331.

edu/dept/cssa/ or write CSSA Graduate Program, College of Education, 104 Joyce Collins Furman Hall, Corvallis, OR 97331.

COUNSELING (MCoun, MS, PhD)

Graduate Areas of Concentration

Clinical mental health counseling (MS only), counseling (PhD only), school counseling (MS only)

The mission of the Oregon State University graduate program in counseling is to prepare professional leaders who promote the social, psychological and physical well-being of individuals, families, communities and organizations. We believe that such professional leaders stand for social, economic and political justice and therefore must be prepared to be proactive educators, change agents and advocates in the face of injustice. Professional leaders are sensitive to life span developmental issues, demonstrate multicultural awareness, and recognize a global perspective as integral to the preparation of professional leaders.

Two graduate degrees are offered in counseling: the Master of Science and the Doctor of Philosophy.

OSU's counselor education degree programs are accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP).

The school counseling degree program is accredited by the National Council for Accreditation of Teacher Education (NCATE) and by Oregon's Teacher Standards and Practices Commission (TSPC). The PhD in Counseling is accredited by CACREP.

Master of Science in Counseling: Offered via Ecampus

The Master of Science degree in Counseling with a school counseling concentration at OSU-Corvallis is offered through Ecampus and the MS program. The program is a 75-credit program to be completed in three years and is offered in a hybrid format (50% online). Classes will be taught at the Chemeketa Community College Center for Business and Industry in Salem. The Master of Science degree uses a competency-based approach to prepare school counselors. The program prepares the counselor to provide comprehensive school counseling programs that serve all students. Counselors will learn to utilize strategies to work with their students' academic, personal/social, and career development needs. Preparation consists of a sequential program that integrates academic knowledge and theory with closely supervised counseling practice. Self-exploration and personal development are integral components of the program.

Graduates are eligible for the Initial I School Counselor License upon completion of additional steps required by the

Oregon Teacher Standards and Practices Commission.

Admission to the MS in Counseling program at OSU Corvallis — Accepting Students for classes starting in the summer of 2013

Application must be made to the Graduate School and to the Counselor Education Program. The minimal prerequisite is a bachelor's degree. Admission is not based exclusively on academic success in courses. Screening includes a minimum GPA of 3.00 and a personal interview in which the applicant's educational goals, experience, and employment background are reviewed. Academic background, personal and emotional stability, and educational and professional goals of each candidate are evaluated before admission is granted. Prior counseling-related academic work from an accredited institution may meet, in part, the requirements of the program. Admission is competitive and by cohort and begins with the summer session.

Academic performance is not the sole criterion for admission to, and continuation in, certain courses, such as practicum courses and internships. The university may evaluate an individual's background to determine the likelihood that he or she will maintain standards of professional conduct necessary in the discipline. An evaluation may consider current performance along with past experiences and actions that could affect a student's ability to perform in the particular course or program.

It should also be noted that individuals who want to become school counselors but who do not have a teaching license are eligible to apply for the school counselor track.

The OSU Corvallis will not be offering a concentration in clinical mental health. Those desiring to graduate from Oregon State University with an MS degree in Counseling with a concentration in clinical mental health need to apply to and be accepted into the OSU-Cascades MS degree in Counseling program. This is a residential program at OSU-Cascades in Bend, Oregon.

Doctor of Philosophy in Counseling: Offered via Ecampus

The PhD degree in Counseling is designed to prepare experienced counseling professionals to extend their roles in the counseling profession. The doctoral program is appropriate for those whose career path is that of research and teaching in counselor preparation programs, in student development at a college or university level, or in supervisory positions in schools or agencies.

Requirements for the PhD

A minimum of 150 credits is required beyond the baccalaureate degree. The program includes thesis, internship,

and the balance of credits in specialty areas, including participation in doctoral seminars. Doctoral students can meet the majority of their residency and course requirements in two years of full-time study.

Admission to the PhD Program

It is expected that individuals entering the PhD program will have completed a master's degree in counseling that covers the nine areas of concentration required by the Council for Accreditation of Counseling and Related Educational Programs (CACREP). The nine areas are human growth and development, social and cultural foundations, helping relationships, groups, career and lifestyle development, appraisal, research and program evaluation, professional orientation, and clinical instruction. Areas not covered in the student's master's program or through continuing higher education must be taken in doctoral study.

Applicants are preferred who have a minimum of two years of post-master's experience as a counselor. Preference will be given to National Certified Counselors (NCCs), state Licensed Professional Counselors (LPCs), and those who are licensed through a school counseling licensing body such as Oregon Teacher Standards and Practices. It is also expected that applicants will have participated in counseling as a client prior to admission to the program. Desirable, but not essential, is work in the field of education such as teaching, school administration, curriculum or instruction, and/or educationally related work in child, youth, or adult development programs.

An application packet may be obtained from the College of Education or downloaded from the website at <http://education.oregonstate.edu/counselor-education-and-supervision>. Included in the application will be demonstrated evidence of counseling competence through submission of a videotaped counseling session. A personal interview is also a final step in the application process.

Admission is by cohort to begin each summer term.

Counseling Major Core (54 credits):

- TCE 513. Counseling Pre-Practicum (3)
- TCE 514. Practicum in Counseling (1–3) (*n.b., taken 2 quarters for 6 credits total*)
- TCE 531. Developmental Perspectives in Counseling (3)
- TCE 532. Social and Cultural Perspectives in Counseling (3)
- TCE 533. Addictive Behavior Counseling (3)
- TCE 541. The Counseling Profession (3)
- TCE 551. Theory and Techniques of Counseling I (3)
- TCE 552. Theory and Techniques of Counseling II (3)
- TCE 562. Introduction to Research Methods in Education (3)
- TCE 567. Appraisal of the Individual (3)

- TCE 568. Lifestyle and Career Development (3)
- TCE 571. Group Counseling Procedures (3)
- TCE 575. Family Counseling (3)
- TCE 577. Applied Psychopathology and Psychodiagnostics (3)
- TCE 578. Crisis, Trauma, and Grief Counseling (3)
- TCE 581. Cross-Cultural Counseling (3)
- TCE 598. Counselor Consultation (3)

CLINICAL MENTAL HEALTH COUNSELING OPTION

Clinical Mental Health Counseling Graduate Option (36 credits):

- TCE 515. Counseling Internship (1–15) (*n.b., taken in clinical mental health setting over multiple quarters for 24 credits total*)
- TCE 536. Applied Psychopharmacology for Counselors (3)
- TCE 550. Foundations of Mental Health Counseling (3)
- TCE 595. Group Counseling II (3)
- TCE 597. Introduction to Counselor Supervision (3)

SCHOOL COUNSELING OPTION

School Counseling Major Option (21 credits):

- TCE 515. Counseling Internship (1–15) (*n.b., taken in school setting over multiple quarters for 15 credits total*)
- TCE 546. Leadership Of School Counseling Programs (3)
- TCE 548. Special Education Issues In Counseling (3)

EDUCATION (EdD, EdM, MS, PhD, MAIS)

Graduate Areas of Concentration

Community college leadership (EdD, PhD); elementary, middle, and secondary education (EdM)

The College of Education offers graduate work leading to the Master of Science in Education, and Master of Education degrees. The Doctor of Education and Doctor of Philosophy degrees are also offered, with a major in education.

Master of Education (EdM) and Master of Science (MS)

The Master of Education (EdM) and the Master of Science (MS) are offered with majors in education. The EdM or the MS with a major in education serves individuals seeking an initial, continuing or standard teaching license. It is also available to anyone interested in a professional degree in education.

EdM Degree (Education Master's)

Applications are considered for acceptance every term. Requirements include:

- Completed bachelor's degree
- 3.0 GPA in the last 90 graded quarter credits
- Teaching credential

Applicants must also submit official transcripts, three letters of recommendation, a résumé, an essay on an

educational topic, a statement regarding knowledge of and/or experience with diversity, and TOEFL and TWE scores (international students only).

The deadline for consideration is five weeks prior to the start of the term in which the applicant would like to begin the course of study

Master of Arts in Teaching (MAT)—NOT ACCEPTING STUDENTS 2013–2014

Immersion Program: This program is a one-year, full-time experience. Students are placed in culturally diverse schools in Salem and Portland. The program leads to initial elementary teaching licensure, an ESOL/Bilingual Endorsement and the master's degree.

Two-Year, Part-Time Program:

This program is a part-time program. Students attend classes on campus approximately one weekend a month for two academic years. The program leads to initial elementary teaching licensure, an ESOL/Bilingual Endorsement and the master's degree.

Master's of Science in Counseling
See the information at Counseling Graduate Major.

Doctor of Education (EdD)

The Doctor of Education (EdD) degree with a major in education prepares professionals for administrative leadership roles in a variety of positions in community college, and/or other higher education settings. This is a part-time, cohort-based program.

Doctor of Philosophy (PhD) Program with Major in Education—NOT ACCEPTING STUDENTS into the Teacher Leadership Area of Concentration in 2013–2014

The Doctor of Philosophy (PhD) program with a major in education prepares professional educators for research and teaching in related programs in higher education. This is a part-time, cohort-based program.

See the College of Education website for application information and dates at <http://oregonstate.edu/education/>.

Admission Requirements EdM Degree (Education Master's)

Applications are considered for acceptance every term. Requirements include:

- Completed bachelor's degree
- 3.0 GPA in the last 90 graded quarter credits
- Teaching credential

Applicants must also submit official transcripts, three letters of recommendation, a résumé, an essay on an educational topic, a statement regarding knowledge of and/or experience with diversity, and TOEFL and TWE scores (international students only).

The deadline for consideration is five weeks prior to the start of the term in

which the applicant would like to begin the course of study.

EdD Degree

Applicants for the EdD degree must have earned a master's degree or the equivalent, a 3.00 GPA, and 3 to 5 years of professional community college experience. Transcripts of previous college work; a résumé; three letters of recommendation; a statement of experiences, goals and philosophy; and a reflection paper on how the application materials submitted address the admission criteria are required for admission consideration. Final applicants are interviewed by the program admissions committee. Admission is selective and competitive. Refer to the program Web page for the specific application deadline for fall term.

The EdD degree requires a minimum of 108 credits beyond the baccalaureate degree. The residency requirement is met by enrolling in a minimum of 3 graduate credits each quarter until completion; enrolling for 9 graduate credits each of three summers; and enrolling at OSU for all 75 graduate credits in the program. The following credits must be completed:

- Foundational Core (15)
- Research Core (9)
- Area of Specialization (48)
- Internship (12)
- Thesis (24)

Total=108

EdD students are admitted into a cohort and proceed through the program together. The program is designed to be completed within a four-year period.

Doctor of Philosophy (PhD) Degree

Applicants must have an earned master's degree or the equivalent, a 3.0 GPA, and two years of professional public school or community college and/or adult education experience or related educational experience. Transcripts of previous college work, a résumé, three letters of recommendation, a statement of experiences, goals and philosophy, and a reflection on how evidence submitted addresses the admission criteria are required for admission consideration. Final applicants are interviewed by the program admissions committee.

A master's degree in education or related field, or equivalent to a master's degree in postbaccalaureate course work is required. In addition, applicants to the PhD program must have significant experience in an education or education-related setting such as teaching, leadership administration, curriculum specialist, supervisor, or in a setting where the primary function is education. Knowledge of educational research methodology is highly desirable.

All Doctor of Philosophy (PhD) students with a major in education must complete a minimum of 114 graduate credits, excluding credits in statisti-

cal analysis, beyond the baccalaureate degree. Minimum number of credits in each category:

- Research Seminar (3)
- Core Courses (9)
- Subcore Seminar (9)
- Area of Specialty (45–48)
- Internship (3–6)
- Research Methods (9)
- Thesis (36)

Total=114–120

Admission to the PhD program is selective and competitive with only a limited number admitted each year. Refer to the program Web page for the specific application deadline for fall term.

MATHEMATICS EDUCATION (MA, MS, PhD)

Graduate Areas of Concentration

Elementary school mathematics, free-choice learning, mathematics education, middle school mathematics, secondary mathematics

Master of Science Program (MS)

The master's program offers three areas of concentration:

1. **Free-Choice Learning**—This degree concentration offers study of learning across the life span in learning environments such as science centers; aquariums; outdoor education; broadcast media; national, state and local parks; and after-school programs.
2. **Professional Teacher Licensure**—In this degree concentration, students earn a professional teaching license in science or mathematics for grades 5 through 12 and a concurrent master of science degree (MS).
3. **School-Based Education**—This degree concentration offers study for specializing in science or mathematics education in schools.

DOCTOR OF PHILOSOPHY PROGRAM (PhD)

The doctoral program offers advanced study and preparation for research in three areas of concentrations.

1. **Collegiate Education**—Advanced study of science and mathematics education at the collegiate level that includes but is not limited to curriculum, assessment, instruction and instructional design, student and teacher learning, psychological factors such as motivation or self-regulation.
2. **Free-Choice Learning**—Advanced study of science and mathematics free-choice learning includes but is not limited to investigations of personal dimensions of learning such as motivation and identity; socio-cultural issues such as gender and culture; and environmental issues

such as the influence of instructional design and setting.

3. **School-Based Education**—Advanced study of science and mathematics education at the pre-college level that includes but is not limited to curriculum, assessment, instruction and instructional design, student and teacher learning, psychological factors such as motivation or self-regulation.

All three options require two years of research content courses and five quarters of research methods courses. A program of study typically involves graduate study in a cognate field. A dissertation is required for all three options.

SCIENCE EDUCATION (MA, MS, PhD)

Graduate Areas of Concentration
Elementary school science, free-choice learning, middle school science, science education, secondary science

Master of Science Program (MS)

The master's program offers three areas of concentration:

1. **School-Based Education**—This degree concentration offers study for specializing in science or mathematics education in schools.
2. **Professional Teacher Licensure**—In this degree concentration, students earn a professional teaching license in science or mathematics for grades 5 through 12 and a concurrent master of science degree (MS).
3. **Free-Choice Learning**—This degree concentration offers study of learning across the life span in learning environments such as science centers; aquariums; outdoor education; broadcast media; national, state and local parks; and after-school programs.

Doctor of Philosophy Program (PhD)

The doctoral program offers advanced study and preparation for research in three areas of concentrations.

1. **Collegiate Education**—Advanced study of science and mathematics education at the collegiate level that includes but is not limited to curriculum, assessment, instruction and instructional design, student and teacher learning, psychological factors such as motivation or self-regulation.
 - **Free-Choice Learning**—Advanced study of science and mathematics free-choice learning includes but is not limited to investigations of personal dimensions of learning such as motivation and identity; socio-cultural issues such as gender and culture; and environmental

issues such as the influence of instructional design and setting.

- **School-Based Education**—Advanced study of science and mathematics education at the pre-college level that includes but is not limited to curriculum, assessment, instruction and instructional design, student and teacher learning, psychological factors such as motivation or self-regulation.

All three options require two years of research content courses and five quarters of research methods courses. A program of study typically involves graduate study in a cognate field. A dissertation is required for all three options.

TEACHING: ADVANCED MATHEMATICS EDUCATION GRADUATE MAJOR (MAT) OR EARN A MATHEMATICS EDUCATION (MS)

For details, see the Science and Mathematics Education advisor in the College of Education.

The MAT in Advanced Mathematics Education program also is available at OSU-Cascades.

TEACHING: AGRICULTURAL EDUCATION GRADUATE MAJOR (MAT)

For details, see the departmental advisor in the College of Agricultural Sciences and/or visit <http://catalog.oregonstate.edu/DepartmentOverview.aspx?code=AED>.

TEACHING: BIOLOGY EDUCATION GRADUATE MAJOR (MAT) OR EARN A SCIENCE EDUCATION (MS)

For details, see the Science and Mathematics Education advisor in the College of Education.

TEACHING: CHEMISTRY EDUCATION GRADUATE MAJOR (MAT) OR EARN A SCIENCE EDUCATION (MS)

For details, see the Science and Mathematics Education advisor in the College of Education.

TEACHING: ELEMENTARY EDUCATION GRADUATE MAJOR (MAT)

For details, please email the College of Education's academic advisor at ask-coed@oregonstate.edu.

TEACHING: FAMILY AND CONSUMER SCIENCES ED GRADUATE MAJOR (MAT)

For details, please email the College of Education's academic advisor at ask-coed@oregonstate.edu.

TEACHING: INTEGRATED SCIENCE EDUCATION GRADUATE MAJOR (MAT) OR EARN A SCIENCE EDUCATION (MS)

For details, see the Science and Mathematics Education advisor in the College of Education.

The MAT in Integrated Science Education program also is available at OSU-Cascades.

TEACHING: LANGUAGE ARTS EDUCATION (MAT)

This degree is offered only on the OSU-Cascades campus.

For details, please e-mail the College of Education's academic advisor at ask-coed@oregonstate.edu.

SOCIAL STUDIES GRADUATE OPTION

For details about this Social Studies Endorsement, please contact the Teacher and Counselor Education Admissions Advisor at OSU-Cascades.

To be admitted to the graduate teaching program, students must demonstrate the following:

1. Completed bachelor's degree.
2. Minimum GPA of 3.0 in the last 90 quarter hours of graded undergraduate work and all work completed thereafter.
3. Subject matter competency (contact an OSU-Cascades advisor for more information, <http://www.osucascades.edu/academics/teaching/secondary/advisor>).
4. At least 60 hours experience working with children at the middle school or high school levels including volunteer work in classroom or other experience (talk to advisor for specific requirement).
5. Demonstrated effectiveness in oral and written communication.
6. Sincere and appropriate desire to become a public school teacher and an understanding of the demands placed on a teacher.
7. Satisfactory answers on the Oregon Teacher Standards and Practices Commission's (TSPC) character questionnaire.
8. Fulfillment of prerequisite course work (contact an OSU-Cascades advisor for more information, <http://www.osucascades.edu/academics/teaching/secondary/advisor>).
9. Successful completion of all testing requirements listed below (prior to beginning course work in June):
 - a. **Essential Academic Skills Test** (EAS subtest 1, 2, and 3) (CBEST may be substituted for EAS, http://www.ctcexams.nesinc.com/about_CBEST.asp)
 - b. **NES Elementary Education I & II** (required for middle school authorization)

- c. **ORELA** Civil Rights exam
- d. **NES** - Content Specific Exam: (for chosen endorsement area only)

TEACHING: MUSIC EDUCATION GRADUATE MAJOR (MAT)

For details, contact the school advisor in the School of Arts and Communication, College of Liberal Arts.

Prerequisites for Professional Music Teacher Education (MAT)

MUED 413. Theory and Practicum: Field (1-4)

MUED 471. Fundamentals of Music for Elementary Classroom Teachers (3)

One of the following courses:

TCE 253. Learning Across the Lifespan (3)

TCE 411. Educational Psychology, Learning and Development (3)

TCE 412. Learning Styles and Needs in Adolescence (2)

TEACHING: PHYSICS EDUCATION GRADUATE MAJOR (MAT) OR EARN A SCIENCE EDUCATION (MS)

For details, see the Science and Mathematics Education advisor in the College of Education.

TEACHING: SPANISH EDUCATION GRADUATE MAJOR (MAT)

For details, please email the College of Education's academic advisor at askcoed@oregonstate.edu.

GRADUATE MINORS

ADULT EDUCATION GRADUATE MINOR

Graduate Areas of Concentration
Organization development and training, work force development, workplace and adult skills development

The Adult Education graduate minor is offered with focus areas in organization development and training, work force development, and workplace development, and requires a minimum of 15 credits of approved course work.

Course work in adult education may also be used as a pre-service concentration or minor in a variety of other graduate degrees.

The graduate programs in education prepare students for a wide range of positions in research, instruction, and policy making at all levels of education and training. Positions include those in city, state, and federal education offices in educational research and analysis programs; in public schools, community colleges, and universities; and in training programs in education, business, industry, and agencies.

Admission to the graduate minor in Adult Education is selective and competitive. Prior approval to enroll in adult education courses is necessary.

For more information, access the college's website at <http://oregonstate.edu/education/programs/adulted.html> or write the Adult Education Graduate Program, College of Education, 104 Joyce Collins Furman Hall, Corvallis, OR 97331 or email the College of Education's academic advisor at askcoed@oregonstate.edu.

COUNSELING GRADUATE MINOR

This minor is available only to College Student Services Administration (CSSA) students. For more details, see the program advisor.

EDUCATION GRADUATE MINOR

For more details, see an advisor in the College of Education, 104 Furman Hall, 541-737-4661 or email the advisor at askcoed@oregonstate.edu.

MATHEMATICS EDUCATION GRADUATE MINOR

Graduate Areas of Concentration
Elementary school science, free-choice learning, middle school science, science education, secondary science

For more details, see the advisor.

SCIENCE EDUCATION GRADUATE MINOR

Graduate Areas of Concentration
Elementary school science, free-choice learning, middle school science, science education, secondary science

For more details, see the advisor.

ENDORSEMENTS

ADVANCED MATHEMATICS ENDORSEMENT

For details about this endorsement, see the Science and Mathematics Education advisor in the College of Education.

AGRICULTURAL SCIENCE AND TECHNOLOGY ENDORSEMENT

For details about this endorsement, please see a departmental advisor in the College of Agricultural Sciences.

BIOLOGY EDUCATION ENDORSEMENT

For details about this endorsement, please see a departmental advisor in the College of Science.

CHEMISTRY EDUCATION ENDORSEMENT

For details about this endorsement, please see a departmental advisor in the College of Science.

COUNSELING, TRACK I ENDORSEMENT

The MS in Counseling degree leads to initial and continuing licenses for the Oregon Personnel Service License, as well as eligibility for Oregon Licensed Profes-

sional Counselor application. The degree also prepares counseling professionals for careers in community and educationally related agencies and programs.

School counselor licensing can be obtained in one of two ways:

School Counseling with a Teaching License. The program track requires prior public school teaching experience and specific course work leading to an MS in counseling.

School Counseling without a Teaching License. This program track prepares persons without a teacher license or counseling experience and requires completion of the MS degree including specific school-based course work in addition to the state requirements for school counselor preparation. Students must present evidence of a passing score on the CBEST or Praxis PPST as part of their application materials.

Part-time School Counseling with Teaching License. This program track requires prior public school teaching experience and specific course work leading to an MS in counseling and allows students who are employed in educational settings to complete their counseling course work during weekends (Fridays and Saturdays) and summers.

The **Master's in Counseling** degree prepares school counselors to support national standards for counseling and the mission of outreach education region wide. The program is designed to recognize the developmental levels of students with continuing professional development as an integral part of the program.

The **PhD in Counseling degree** is designed to prepare experienced counseling professionals to extend their roles in the counseling profession. The doctoral program is appropriate for those whose career path is that of research and teaching in counselor preparation programs, in student development at a college or university level, or in supervisory positions in schools or agencies.

COUNSELING, TRACK II ENDORSEMENT

The MS in Counseling degree leads to initial and continuing licenses for the Oregon Personnel Service License, as well as eligibility for Oregon Licensed Professional Counselor application. The degree also prepares counseling professionals for careers in community and educationally related agencies and programs.

School counselor licensing can be obtained in one of two ways:

School Counseling with a Teaching License. The program track requires prior public school teaching experience and specific course work leading to an MS in counseling.

School Counseling without a Teaching License. This program track prepares persons without a teacher

license or counseling experience and requires completion of the MS degree and specific school-based course work in addition to the state requirements for school counselor preparation. Students must present evidence of a passing score on the CBEST or Praxis PPST as part of their application materials.

Part-time School Counseling with Teaching License. This program track requires prior public school teaching experience and specific course work leading to an MS in counseling and allows students who are employed in educational settings to complete their counseling course work during weekends (Fridays and Saturdays) and summers.

The **Master's in Counseling** degree prepares school counselors to support national standards for counseling and the mission of outreach education region wide. The program is designed to recognize the developmental levels of students with continuing professional development as an integral part of the program.

The **PhD in Counseling** degree is designed to prepare experienced counseling professionals to extend their roles in the counseling profession. The doctoral program is appropriate for those whose career path is that of research and teaching in counselor preparation programs, in student development at a college or university level, or in supervisory positions in schools or agencies.

EARLY CHILDHOOD TEACHER EDUCATION ENDORSEMENT

For details about this endorsement, see an advisor in the College of Education, 541-737-4661.

ELEMENTARY EDUCATION ENDORSEMENT

For details about this endorsement, please see an advisor in the College of Education, 541-737-4661.

ESOL/BILINGUAL ENDORSEMENT

For details about this endorsement, see an advisor in the College of Education, 541-737-4661.

FAMILY AND CONSUMER SCIENCE ENDORSEMENT

For details about this endorsement, see an advisor in the School of Social and Behavioral Health Sciences, College of Public Health and Human Sciences, and/or visit <http://catalog.oregonstate.edu/DepartmentDetail.aspx?code=SBHS>.

FRENCH LANGUAGE ENDORSEMENT

For details about this endorsement, see an advisor in the School of Language, Culture, and Society in the College of Liberal Arts, and/or visit <http://catalog.oregonstate.edu/DepartmentOverview.aspx?code=SLCS>.

GERMAN ENDORSEMENT

For details about this endorsement, see an advisor in the School of Language, Culture, and Society in the College of Liberal Arts, and/or visit <http://catalog.oregonstate.edu/DepartmentOverview.aspx?code=SLCS>.

HEALTH EDUCATION ENDORSEMENT

For details about this endorsement, please see an advisor in the College of Education.

INTEGRATED SCIENCE EDUCATION ENDORSEMENT

For details about this endorsement, see an advisor in the College of Education, 541-737-4661.

JUNIOR HIGH/MIDDLE SCHOOL ENDORSEMENT

For details about this endorsement, see an advisor in the College of Education, 541-737-4661.

LANGUAGE ARTS EDUCATION ENDORSEMENT

For details about this endorsement, see an advisor in the College of Education, 541-737-4661.

MATHEMATICS, BASIC ENDORSEMENT

For details about this endorsement, see the Science and Mathematics Education advisor in the College of Education.

MUSIC EDUCATION ENDORSEMENT

For details about this endorsement, please see an advisor in the School of Arts and Communication in the College of Liberal Arts.

PHYSICAL EDUCATION ENDORSEMENT

For details about this endorsement, please see an advisor in the College of Education, 541-737-4661, or College of Public Health and Human Sciences, 541-737-5925.

PHYSICAL EDUCATION, ADAPTED ENDORSEMENT

For details about this endorsement, see an advisor in the School of Biological and Population Health Sciences, 541-737-5925, College of Public Health and Human Sciences, and/or visit <http://catalog.oregonstate.edu/MajorDetail.aspx?major=7640&college=23>.

PHYSICS EDUCATION ENDORSEMENT

For details about this endorsement, see the Science and Mathematics Education advisor in the College of Education.

READING ENDORSEMENT

For details about this endorsement, please see an advisor in the College of Education, 541-737-4661.

SECONDARY TEACHER EDUCATION ENDORSEMENT

For details about this endorsement, see an advisor in the College of Education, 541-737-4661.

SOCIAL SCIENCE EDUCATION ENDORSEMENT

For details about this endorsement, please see an advisor in the College of Education.

SPANISH LANGUAGE ENDORSEMENT

For details about this endorsement, see an advisor in the School of Language, Culture, and Society in the College of Liberal Arts, and/or visit <http://catalog.oregonstate.edu/DepartmentOverview.aspx?code=SLCS>.

ADULT EDUCATION AND HIGHER EDUCATION LEADERSHIP COURSES

AHE 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

AHE 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

AHE 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

AHE 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

AHE 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits.

AHE 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

AHE 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

AHE 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

AHE 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

AHE 410. INTERNSHIP/WORK EXPERIENCE (1-16). This course is repeatable for a maximum of 16 credits.

AHE 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

AHE 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

AHE 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits.

AHE 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

AHE 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

AHE 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

AHE 507. SEMINAR (1-5). This course is repeatable for a maximum of 16 credits.

AHE 508. WORKSHOP (1-3). This course is repeatable for a maximum of 16 credits.

AHE 509. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

AHE 510. INTERNSHIP (1-18). By special permission and arrangement. This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

AHE 513. RESEARCH IN HIGHER EDUCATION (3). Basic understanding of research and assessment ideas, uses, and practices in higher education and student affairs.

AHE 517. EDUCATION AND WORK (3). Issues related to work in the U.S. and other countries. The role of public, private, corporate, government, military and other education and training programs in meeting changing individual, corporate, and social work-related needs.

AHE 520. MULTICULTURAL ISSUES IN HIGHER EDUCATION (3). Developing understanding, knowledge, and skills of multiculturalism affecting the student affairs profession and careers in student affairs administration.

AHE 521. CROSS-CULTURAL COMMUNICATIONS (3). Cultural diversity in schools, work places and communities; serving all students or clients in a pluralistic society. This course is repeatable for a maximum of 9 credits.

AHE 522. INSTRUCTIONAL TECHNOLOGY I (1). Explores technologies used in distance education to deliver content and meet with students. Participants will learn course management tools, library references, social learning environments, and file management methods.

AHE 523. INSTRUCTIONAL TECHNOLOGY II (1). A review of best practices and common pitfalls in the design and development of a portfolio. Students will design, build, and share their portfolios through Blackboard. **PREREQS:** AHE 522

AHE 524. INSTRUCTIONAL TECHNOLOGY III (1). Students will gather content information, manage materials, and build a rapid online-learning training solution using PowerPoint. **PREREQS:** (AHE 522 and AHE 523)

AHE 525. INSTRUCTIONAL TECHNOLOGY IV (1). Learners research and demonstrate how to use a current e-learning tool. Students will incorporate principles of adult learning theory to align and effectively integrate aspects of an e-learning tool. **PREREQS:** (AHE 522 and AHE 523 and AHE 524)

AHE 530. LEARNING AND WORKPLACE CULTURES (3). Examination of workplace cultures, structures, and processes as they promote and hinder organizational and employee learning and performance, identification of criteria for evaluating a learning environment.

AHE 531. INSTRUCTIONAL SYSTEMS DESIGN I (4). The application of systems thinking in the design of college curriculum and workplace training programs. **PREREQS:** (AHE 533 and AHE 547 and AHE 553)

AHE 532. INSTRUCTIONAL SYSTEMS DESIGN II (4). Assessing learning outcomes in college curriculum and workplace training programs from a systems perspective; evaluation of program effectiveness. **PREREQS:** AHE 531

AHE 533. NEEDS ASSESSMENT AND RESEARCH (4). Introduces workplace learning needs assessment (W/LNA) and research principles and practices for individual and collaborative learning groups. **PREREQS:** AHE 553 and .

AHE 534. ORGANIZATIONS AND SYSTEMS THEORY (4). Introduces principles and practices underlying individual and collaborative work group learning. Participants will learn how to create an environment that promotes effective and efficient workplace learning.

AHE 539. DESIGNING TRAINING DOCUMENTATION (4). Application of instructional systems design, adult learning theory, and instructional strategies to create documents for a

professional training system. **PREREQS:** (AHE 531 and AHE 532 and AHE 533 and AHE 547 and AHE 553)

AHE 540. THE EMERGING COMMUNITY COLLEGE (3). History and philosophy of the community college movement; goals, functions, populations served, faculty and student characteristics, issues confronting the community college in a global economy.

AHE 547. INSTRUCTIONAL STRATEGIES FOR ADULT LEARNERS (4). Exploration of and practice using instructional strategies to enhance adult learning. Acquisition of an instructional strategy tool kit as well as a method for evaluating adult learning events. This course is repeatable for a maximum of 60 credits.

AHE 548. AMERICAN HIGHER EDUCATION (3). The origins and development of higher education in the United States from the colonial colleges to the present.

AHE 551. PROGRAMS AND FUNCTIONS IN COLLEGE STUDENT SERVICES (3). Historical, philosophical, and organizational foundations; operational components and functional areas; overview and analysis of college student services in postsecondary educational institutions; leadership development.

AHE 552. STUDENT DEVELOPMENT IN UNIVERSITIES AND COLLEGES (3). Theoretical and philosophical foundations of student development; analysis of college student characteristics and the student culture; nontraditional student subgroups; student attitudes, values, and beliefs; concepts and models that promote student learning; and assessment of student growth. This course is repeatable for a maximum of 6 credits.

AHE 553. ADULT LEARNING AND DEVELOPMENT (4). Introduce participants to key theories, orientations, models, and principles of learning and development in adulthood.

AHE 554. LEGAL ISSUES IN HIGHER EDUCATION (3). A comprehensive presentation and discussion of the law governing administration within public colleges and universities with a special emphasis on tort liability and freedom of expression.

AHE 557. PROFESSIONAL DEVELOPMENT IN COLLEGE STUDENT SERVICES (1). Self-assessment, goal setting, professional growth, and professional ethics as a practitioner in college student services administration. Graded P/N.

AHE 558. ORGANIZATION AND ADMINISTRATION OF COLLEGE STUDENT SERVICES (3). Legal foundations, governance models, planning, and goal setting, resource acquisition and allocation, personnel and financial management and administrative leadership.

AHE 567. LEADERSHIP DEVELOPMENT AND HUMAN RELATIONS (4). Exploration of multiple theories of leadership in different organizational contexts; synthesize theory with experience to construct a personal framework for leadership practice.

AHE 574. BUDGET AND FINANCE (2). Introduction to budget and finance in student services. Overview of topics with which student affairs practitioners should be familiar, able to use, and to assess.

AHE 575. EDUCATIONAL FINANCE (3). Finance, budgeting and accounting for sources of revenue; deferral, state and local financing, budgeting and accounting models, practical experience combined with examination of theory, trends and issues. Focus in either public schools, community colleges or higher education through practical experience.

AHE 582. LEGAL ISSUES IN HIGHER EDUCATION (3). A comprehensive presentation and discussion of the law governing administration within community colleges and college/universities

with a special emphasis on student services administration.

AHE 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

AHE 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

AHE 602. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

AHE 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

AHE 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

AHE 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

AHE 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

AHE 608. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

AHE 609. PRACTICUM/CLINICAL EXPERIENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

AHE 610. INTERNSHIP (1-15). This course is repeatable for a maximum of 15 credits. **PREREQS:** Departmental approval required.

AHE 612. RESEARCH PERSPECTIVES IN EDUCATION (3). Research perspectives, how they are influenced by worldviews, and how these worldviews influence research. **PREREQS:** AHE 562; an introductory statistics course (may be taken concurrently).

AHE 613. RESEARCH ANALYSIS AND INTERPRETATION IN EDUCATION (3). Critical analysis of scholarly studies in education from a variety of research perspectives. **PREREQS:** AHE 612; an intermediate statistics course (may be taken concurrently).

AHE 614. ADVANCED RESEARCH METHODS IN EDUCATION (1-3). Selected topics in research methods as appropriate for research perspectives in education. May be repeated. This course is repeatable for a maximum of 6 credits. **PREREQS:** AHE 613

AHE 615. RESEARCH ISSUES (3). A core course in the College of Education's doctoral program that focuses on research issues. **PREREQS:** (AHE 612 and AHE 613 and AHE 614)

AHE 621. SELECTED TOPICS IN EDUCATION (1-3). This course is repeatable for a maximum of 18 credits.

AHE 638. HISTORY OF HIGHER EDUCATION (3). Surveys American higher education across 200-plus years of American history, with a specific emphasis in this section on the American community college.

AHE 640. COMMUNITY COLLEGE ADMINISTRATION (3). Two-year college funding patterns, state and local systems of organization, management and leadership issues, patterns of internal and external governance, institutional planning, and methods for institutional advancements. **PREREQS:** Community college teaching/administrative experience.

AHE 643. ORGANIZATION THEORY-HIGHER EDUCATION (3). An introduction to organizational theory (OT). The texts allow us to explore how systems thinking is applied to our world, and how we can use it to better understand the nature of human social engagement. Both OT and living systems theories are deeply associated with

improvement and change theories in higher education settings and business.

AHE 645. ETHICAL PRACTICE (3). Reviews major ethical theories with an emphasis on practical applications related to community college professional practice.

AHE 653. INSTRUCTIONAL LEADER I (3). A core course in the College of Education's doctoral program. Introduces major theories, theorists, and theoretical principles that will assist the learner in the understanding and development of systemic frameworks for instructional leadership.

AHE 654. INSTRUCTIONAL LEADER II (3). Focuses on the current realities of instructional leadership in community and technical colleges at present. **PREREQS:** AHE 653

AHE 685. CAREER PLANNING AND PLACEMENT ADMINISTRATION (3). Advanced study of vocational decision making and career planning in colleges and universities, as well as the organization and administration of career services.

AHE 805. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

AHE 808. WORKSHOP (1-4). This course is repeatable for a maximum of 16 credits.

■ SCIENCE AND MATHEMATICS EDUCATION COURSES

SED 321. TEACHING AND LEARNING WITH COMPUTER-BASED TECHNOLOGIES (3). Explore teaching that promotes the use of computer-based technologies as an integral component for learning within the context of academic subject matter. **PREREQS:** Basic computer and computer application knowledge.

SED 321H. TEACHING AND LEARNING WITH COMPUTER-BASED TECHNOLOGIES (3). Explore teaching that promotes the use of computer-based technologies as an integral component for learning within the context of academic subject matter. **PREREQS:** Basic computer and computer application knowledge, Honors College approval required.

SED 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

SED 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

SED 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

SED 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

SED 409. FIELD PRACTICUM: SCIENCE AND MATHEMATICS (3). Placement in middle or high school (grades 7-12) to assist in developing competencies with adolescents in science/mathematics classes. This course is repeatable for a maximum of 18 credits.

SED 410. PROFESSIONAL INTERNSHIP: SCIENCE OR MATHEMATICS EDUCATION (1-16). Supervised teaching experience at the elementary, middle or high school level; students experience general classroom and professional responsibilities common to the regular science or mathematics teacher. This course is repeatable for a maximum of 16 credits.

SED 412. TECHNOLOGY FOUNDATIONS FOR TEACHING MATH AND SCIENCE (3). Integration of instructional technologies with other strategies to teach math and science in elementary, middle, and secondary schools in the 21st century.

SED 412H. TECHNOLOGY FOUNDATIONS FOR TEACHING MATH AND SCIENCE (3). Integration of instructional technologies with other strategies to teach math and science in elementary, middle, and secondary schools in the 21st century. **PREREQS:** Honors College approval required.

SED 413. INQUIRY IN SCIENCE AND SCIENCE EDUCATION (3). Investigation of inquiry and the nature of inquiry in science as it relates to science education. Students will examine issues relating to integrating scientific understandings and practice into K-12 instruction. Lec/lab.

SED 414. INQUIRY IN MATHEMATICS AND MATHEMATICS EDUCATION (3). Investigation of mathematics as it relates to mathematics education. Students will examine issues related to integrating mathematical understanding, mathematics standards/curricula, and mathematics-specific strategies in K-12 instruction. Lec/lab.

SED 417. QUANTITATIVE REASONING IN STEM (3). Provides students an overview of the content requirements in the Common Core Standards for Mathematics and the teaching practices that are central to those standards with a focus on the role of quantitative reasoning. Students experience content lessons and lessons focused on supporting students in developing understanding of that content. **PREREQS:** Participants should be a prospective pre-service teacher at any level, a K-12 teacher, a free-choice learning educator, or have access to an educational setting.

SED 419. TEACHING MATHEMATICAL MODELING IN STEM (3). Provides students an overview of the content requirements in the Common Core Standards for Mathematics and the teaching practices that are central to those standards with a focus on the role of mathematical modeling. Students experience content lessons and lessons focused on supporting students in developing understanding of that content. **PREREQS:** Participants should be a prospective pre-service teacher at any level, a K-12 teacher, free-choice learning educator or have access to an educational setting.

SED 431. OVERVIEW OF FREE-CHOICE LEARNING (3). Examines learning that occurs when people believe they have choices over what and how they learn, how much time they spend learning, and what their sources of information are. Covers current research on learning in museums, aquariums, zoos, botanical gardens, science centers, after-school programs, media and apprenticeships.

SED 459. SCIENCE AND THE NATURE OF INQUIRY (3). Focuses on inquiry approaches to the teaching and learning of science. Development of teaching strategies including materials and resources for teaching science using an inquiry approach as well as more teacher-directed approaches.

SED 473. SCIENCE PEDAGOGY AND TECHNOLOGY I (4). Development of pedagogical content knowledge in grades 6-12 science instruction: learning theory, nature of science, technology integration, and reform recommendations. Lec/lab/rec.

SED 474. MATHEMATICS PEDAGOGY AND TECHNOLOGY I (4). Development of pedagogical content knowledge in grades 6-12 mathematics instruction: learning theory, nature of mathematics, technology integration, and reform recommendations. Lec/lab/rec.

SED 491. SCIENCE/MATH CONTENT STANDARDS AND CURR DEVEL MIDDLE SCHOOL (3). Exploration of curriculum development and teaching strategies appropriate for middle school students as well as a range of organizational structures to effectively organize middle school students for educational experiences. Explore how curriculum, instruction, and assessment are interrelated and how theory and practice must be combined to make appropriate decisions. Development of skills in designing effective curriculum and instruction integrating these methods with existing understandings of their content area, how people learn, and the diverse communities in which they work.

SED 494. SCIENCE/MATH CONTENT STANDARDS AND CURR DEVEL HIGH SCHOOL (3). Exploration of curriculum development and teaching strategies appropriate for high school students as well as a range of organizational structures to effectively organize high school students for educational experiences. Explore how curriculum, instruction, and assessment are interrelated and how theory and practice must be combined to make appropriate decisions. Development of skills in designing effective curriculum and instruction integrating these methods with existing understandings of their content area, how people learn, and the diverse communities in which they work.

SED 499. SPECIAL TOPICS (3). This course is repeatable for a maximum of 18 credits.

SED 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

SED 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

SED 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

SED 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

SED 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

SED 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

SED 509. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

SED 510. PROFESSIONAL INTERNSHIP: SCIENCE OR MATHEMATICS EDUCATION (1-16). Supervised teaching experience at the elementary, middle or high school level; students experience general classroom and professional responsibilities common to the regular science or mathematics teacher. This course is repeatable for a maximum of 16 credits.

SED 511. ANALYSIS OF CLASSROOMS I (3). Observation and analysis of the complex science/mathematics classroom (grades 3-12) and school culture and their impact on student learning.

SED 512. TECHNOLOGY FOUNDATIONS FOR TEACHING MATH AND SCIENCE (3). Integration of instructional technologies with other strategies to teach math and science in elementary, middle, and secondary schools in the 21st century.

SED 513. INQUIRY IN SCIENCE AND SCIENCE EDUCATION (3). Investigation of inquiry and the nature of inquiry in science as it relates to science education. Students will examine issues relating to integrating scientific understandings and practice into K-12 instruction. Lec/lab.

SED 514. INQUIRY IN MATHEMATICS AND MATHEMATICS EDUCATION (3). Investigation of mathematics as it relates to mathematics education. Students will examine issues related to integrating mathematical understanding, mathematics standards/curricula, and mathematics-specific strategies in K-12 instruction. Lec/lab.

SED 515. ANALYSIS OF CLASSROOMS II (3). Reflection, analysis and problem solving recognizing the complexity of concerns impacting teachers in the science/mathematics classroom (grades 3-12).

SED 517. QUANTITATIVE REASONING IN STEM (3). Provides students an overview of the content requirements in the Common Core Standards for Mathematics and the teaching practices that are central to those standards with a focus on the role of quantitative reasoning. Students experience content lessons and lessons focused on supporting students in developing understanding of that content. **PREREQS:** Participants should be a prospective pre-service teacher at any level, a K-12 teacher, a free-choice learning educator, or have access to an educational setting.

SED 518. ANALYSIS OF CLASSROOMS III (3). Analysis and support of students as learners in the science/math classrooms (grades 3-12): cultural, psychological, sociological, economic, and instructional concerns.

SED 519. TEACHING MATHEMATICAL MODELING IN STEM (3). Provides students an overview of the content requirements in the Common Core Standards for Mathematics and the teaching practices that are central to those standards with a focus on the role of mathematical modeling. Students experience content lessons and lessons focused on supporting students in developing understanding of that content. **PREREQS:** Participants should be a prospective pre-service teacher at any level, a K-12 teacher, free-choice learning educator or have access to an educational setting.

SED 520. INTEGRATING TECHNOLOGY & LITERACY IN LEARNING MATH & SCIENCE (3). Explores teaching integrating multimedia information and communication technologies that support students in becoming critical thinkers and creative producers of their knowledge and understanding in mathematics and science. **PREREQS:** Basic computer literacy.

SED 521. TEACHING MATH & SCIENCE WITH DIGITAL & VIDEO TECHNOLOGIES (3). Examine and incorporate digital image and video technologies to support learners in becoming critical thinkers and creative producers of their knowledge and understanding in mathematics/science. **PREREQS:** Participants must be teachers of mathematics/science in K-12 formal or informal learning environments.

SED 522. DYNAMIC SPREADSHEETS AS LEARNING TOOLS IN SCIENCE AND MATH (3). Provides opportunities to explore the algebraic reasoning involved when engaging students in learning with spreadsheets in science and mathematics classes. Students redesign units of instruction for grades 3-12 that integrate learning about designing dynamic and dependable spreadsheets as learning tools in science and mathematics. Explore how dynamic spreadsheets encourage students to extend problems and considering alternative questions.

SED 523. SCIENCE/MATHEMATICS STRATEGIES AND ORGANIZATIONAL STRUCTURES (4). Builds on content developed in SED 491. Students learn new instructional skills and deepen abilities with basic teaching skills from SED 491. Students develop in-depth lesson plans and coordinate instructional and assessment plans supporting a unit of science or mathematics content for middle level students. **PREREQS:** SED 491 and provisional admission to Professional Education Program

SED 525. SCIENCE/MATHEMATICS CURRICULUM IMPL & INSTRUCT STRATEGIES-HS (4). Exploration of science/mathematics teaching strategies appropriate for high school science/mathematics learners as well as a range of organizational structures to effectively organize high school science/mathematics students for educational experiences. **PREREQS:** SED 494 and provisional admission to Professional Education Program

SED 531. OVERVIEW OF FREE-CHOICE LEARNING (3). Examines learning that occurs when people believe they have choices over what and how they learn, how much time they spend learning, and what their sources of information are. Covers current research on learning in museums, aquariums, zoos, botanical gardens, science centers, after-school programs, media and apprenticeships.

SED 540. FIELD AND ONLINE LEARNING OF GEOSCIENCE CONCEPTS (3). Science content and pedagogy in learning and teaching standards-based geologic content for K-12 teachers. This is a hybrid class combining distance learning and at least one field research trip. **PREREQS:** Participants should be either a K-12 teacher or a

free-choice learning educator. Participants should be prepared to camp during field trips and able to walk moderate distances that may involve off-trail maneuvering. Participants should be able to integrate graphics and images into different media (e.g., PowerPoint, Prezi, video), acquire images from web pages and use Google Earth. Some instruction in using Google Earth will be provided.

SED 541. WEATHER CONCEPTS FOR SCIENCE AND MATH TEACHING (3). Science content and pedagogy in learning and teaching basic weather concepts. **PREREQS:** Participants should be either a K-12 teacher, free-choice learning educator or have access to an educational setting.

SED 552. MATHEMATICS METHODS: PRACTICUM I (3). Theoretical background, practical knowledge, and skills for teaching in mathematics classrooms (grades 3-12). Instructional methods/modes, classroom management, contemporary curriculum goals and instructional planning.

SED 553. SCIENCE METHODS: PRACTICUM I (3). Theoretical background, practical knowledge, and skills for teaching in science classrooms (grades 3-12). Instructional methods/modes, classroom management, contemporary curriculum goals and instructional planning.

SED 554. MATHEMATICS METHODS: PRACTICUM II (3). Methods and problems in planning for mathematics instruction using an activity and laboratory approach; teaching strategies, organizing materials, evaluating student progress, and managing student behavior.

SED 555. SCIENCE METHODS: PRACTICUM II (3). Methods and problems in planning for science instruction using an activity and laboratory approach; teaching strategies, organizing materials, evaluating student progress, and managing student behavior.

SED 556. MATHEMATICS METHODS: PRACTICUM III (3). Planning for mathematics instruction (grades 3-12) using an activity and inquiry laboratory approach; teaching strategies, organizing materials, evaluating student progress, and managing student behavior.

SED 557. SCIENCE METHODS: PRACTICUM III (3). Planning for science instruction (grades 3-12) using an activity and inquiry laboratory approach; teaching strategies, organizing materials, evaluating student progress, and managing student behavior.

SED 562. MATHEMATICS MICROTEACHING LABORATORY (3). Develop, practice, and improve specific instructional skills, strategies, and modes in small-group teaching and learning situations.

SED 563. SCIENCE MICROTEACHING LABORATORY (3). Develop, practice, and improve specific instructional skills, strategies, and modes in small-group teaching and learning situations.

SED 564. ENGINEERING AND SCIENCE IN THE LIVES OF STUDENTS (3). Construction engineering is the vehicle through which participants learn to integrate science and technology using research-based teaching methods. By designing problems and investigations based on the built environment of modern life, concepts in science and engineering are made relevant as genuinely useful ideas in the everyday life of students. **PREREQS:** Assignments assume the participant is a K-12 teacher, free-choice learning educator (in museum, science camp, etc.), enrolled in a graduate licensure program, or has access to an educational setting.

SED 565. INQUIRING INTO SCIENCE AND MATHEMATICS LEARNING AND TEACHING (3). Participants prepare to lead instructional changes in their communities by planning inquiries into the learning they foster in their own contexts, critiquing relevant literature, making connections to national standards, and constructing a documentary

Web site or writing a journal article that reports upon ways to foster science and/or mathematics learning. **PREREQS:** Student must be a licensed teacher, enrolled in a teacher education program, or have experience in working with youth in an educational setting.

SED 566. FOSTERING REFLECTIVE DISCOURSE IN SCIENCE AND MATH CONTEXTS (3). Examines ways of speaking that foster learning in science and mathematics contexts such as K-16 classrooms and free-choice learning settings (i.e. museums, zoos, science camps, etc.). Assignments assume the participant is a K-12 teacher or free-choice learning educator enrolled in a graduate licensure program or has access to an educational setting.

SED 567. DESIGNING PROBLEM-BASED CURRICULA (3). Students in this Ecampus course will learn a framework for designing problem-based activities and curricula around current environmental health science problems through studying units from published problem-based curricula. Participants will gain understanding of curricular design principles, the relationship among curricular design, instruction, and assessment.

SED 568. ENHANCING LITERACY LEARNING IN SCIENCE AND MATH CONTEXTS (3). Examining ways of enhancing literacy learning will include analyzing research on learning to speak clearly, listen closely, write coherently, read with comprehension, and make and critique media resources competently in science and mathematics contexts. Settings include K-12 classrooms and free-choice learning environments such as zoos, museums and science camps.

SED 571. TECHNOLOGY AND PEDAGOGY I (1). Development of pedagogical content knowledge in science and mathematics education focused on the integration of technology in teaching and learning (grades 3-12). Lec/lab/rec.

SED 572. TECHNOLOGY AND PEDAGOGY II (1). Development of pedagogical content knowledge in science and mathematics education focused on the integration of technology in teaching and learning (grades 3-12).

SED 573. SCIENCE PEDAGOGY AND TECHNOLOGY I (4). Development of pedagogical content knowledge in grades 6-12 science instruction: learning theory, nature of science, technology integration, and reform recommendations. Lec/lab/rec.

SED 574. MATHEMATICS PEDAGOGY AND TECHNOLOGY I (4). Development of pedagogical content knowledge in grades 6-12 mathematics instruction: learning theory, nature of mathematics, technology integration, and reform recommendations. Lec/lab/rec.

SED 576. MATHEMATICS PEDAGOGY AND TECHNOLOGY II (4). Development of additional pedagogical content knowledge in grades 6-12; stress on dominant themes of the school mathematics curriculum including problem solving, reasoning, communication, and connections as well as the integration of technology into the mathematics classroom. Lec/rec/lab.

SED 577. SCIENCE PEDAGOGY AND TECHNOLOGY II (4). Development of additional pedagogical content knowledge in grades 6-12; stress on dominant themes in national reforms including inquiry and nature of science, as well as the integration of technology into the science classroom. Lec/lab/rec.

SED 580. RESEARCH AND EVALUATION (3). Analysis of qualitative and quantitative empirical research in science education, mathematics education and education in general. Development of data collection instruments for use by researchers and teachers of science education, mathematics education and education in general, including portfolio and other forms of alternative assessment.

SED 581. PROFESSIONAL DEVELOPMENT AND PRACTICUM IN MATHEMATICS (3).

Developing and implementing a program for continuing learning and evaluation in mathematics education.

SED 582. PERSONAL DIMENSIONS OF FREE-CHOICE LEARNING (3).

Investigates the fundamental roles that identity, motivation, interest, prior knowledge and experience, and choice and control play in supporting learning and how learning leaders can build on these dimensions of learning in order to successfully engage lifelong learners.

SED 583. SOCIO-CULTURAL DIMENSIONS OF FREE-CHOICE LEARNING (3).

Investigates connections between theories of free-choice learning and the fundamental concepts of sociology, social psychology and anthropology: social stratification, social structure and interaction, social institutions, and cultural background. Real world examples will be included to support learning leaders' efforts to facilitate the socio-cultural dimensions of lifelong science and mathematics learning.

SED 584. PHYSICAL DIMENSIONS OF FREE-CHOICE LEARNING (3).

Learning is influenced by the interaction of variables within three contexts--personal, socio-cultural and physical. This course focuses on how macro-scale environmental factors (e.g. space, crowding, novelty) and micro-scale environmental factors (e.g. design elements, real objects, different media) support free-choice learning.

SED 588. MATHEMATICS CURRICULUM (3).

Current trends, history of these trends, and the rationale for mathematics reform.

SED 589. ADVANCED TOPICS: MATHEMATICS EDUCATION (3).

Current issues in mathematics education. May be repeated for credit with different topics. Lec/lab. This course is repeatable for a maximum of 99 credits.

SED 592. PROFESSIONAL DEVELOPMENT AND PRACTICUM IN SCIENCE (3).

Developing and implementing a program for continuing learning and evaluation in science education.

SED 593. ADVANCED STRATEGIES: SCIENCE (3).

Provides additional exposure and development of instructional strategies and models of science teaching. Special emphasis is placed upon promoting critical thinking and decision making.

SED 594. ADVANCED STRATEGIES: MATHEMATICS (3).

Provides additional exposure and development of instructional strategies and models of mathematics teaching. Special emphasis is placed upon promoting critical thinking and decision making.

SED 595. ASSESSMENT AND EVALUATION (3).

Contemporary assessment and evaluation theory and the development of valid cognitive, affective, and psycho-motor assessment items/tasks. In-depth attention is given to the development and scoring of alternative assessment techniques such as portfolios and projects.

SED 596. METHODS OF COLLEGE TEACHING IN MATHEMATICS AND SCIENCE (3).

Focuses on methods and problems in planning and implementing mathematics or science instruction at the college level. Particular emphasis is placed upon selecting teaching strategies, organizing materials, and evaluating student assessment.

SED 597. PROFESSIONAL DEVELOPMENT IN MATHEMATICS AND SCIENCE EDUC (3).

Development of strategies and skills for developing, implementing and evaluating a program of professional development for mathematics or science educators considering various choices of program settings.

SED 598. MATHEMATICS AND SCIENCE CURRICULUM (3).

Current trends, history of these trends, and rationale for mathematics and science curriculum reform.

SED 599. TOPICS IN SCIENCE EDUCATION (3).

Current issues, trends, and topics in science education. May be repeated for credit with different topics. This course is repeatable for a maximum of 18 credits.

SED 601. RESEARCH (1-16).

This course is repeatable for a maximum of 16 credits.

SED 603. DISSERTATION (1-16).

This course is repeatable for a maximum of 999 credits.

SED 605. READING AND CONFERENCE (1-16).

This course is repeatable for a maximum of 16 credits.

SED 606. PROJECTS (1-16).

This course is repeatable for a maximum of 16 credits.

SED 607. SEMINAR (1-16).

This course is repeatable for a maximum of 16 credits.

SED 608. WORKSHOP (1-16).

This course is repeatable for a maximum of 16 credits.

SED 611. SURVEY OF RESEARCH ON TEACHING (3).

Critical analysis of perspectives of research in science/math education with a focus on teaching as the unit of analysis. **PREREQS:** SED 580

SED 612. QUANTITATIVE RESEARCH DESIGN AND CRITICAL ANALYSIS (3).

A study of quantitative research designs and analytical procedures with specific applications in science and mathematics education. **PREREQS:** SED 580*

SED 613. LEARNING THEORY (3).

Provides a critical overview and analysis of current theories of learning and development, beginning with a discussion about what learning is, how it has been viewed and studied over time, and how seminal theories inform an understanding of lifelong learning and its facilitation. **PREREQS:** SED 580*

SED 615. PRACTICUM IN MATHEMATICS/SCIENCE IN COLLEGE TEACHING (3).

Supervised field practicum in college mathematics/science teaching. This course is repeatable for a maximum of 9 credits.

SED 621. SURVEY OF RESEARCH ON LEARNING (3).

Critical analysis of perspectives on student thinking and learning in science/math education. **PREREQS:** SED 580*

SED 622. QUALITATIVE RESEARCH TECHNIQUES (3).

A study of qualitative research designs and analytical procedures with specific applications in science and mathematics education. **PREREQS:** SED 580*

SED 623. CURRICULUM THEORY (3).

Establishes theoretical grounding of curriculum. Includes theoretical background, practical knowledge, and skills related to science and mathematics curriculum, including the history, curriculum theory and practice. **PREREQS:** SED 580*

SED 699. SPECIAL TOPICS (1-16).

This course is repeatable for a maximum of 16 credits.

SED 808. WORKSHOP (1-16).

This course is repeatable for a maximum of 99 credits.

TEACHER AND COUNSELOR EDUCATION COURSES**TCE 199. SPECIAL TOPICS (1-16).**

This course is repeatable for a maximum of 16 credits.

TCE 216. *PURPOSE, STRUCTURE, & FUNCTION OF EDUCATION IN A DEMOCRACY (3).

Examines the system of education in a democratic society-- past, present, and future. Historical, social, philosophical, political, legal, and economic foundations of education in Oregon, the USA, and other countries provide a framework for analyzing contemporary educational issues in schools, communities, and workplaces. (Bacc Core Course)

TCE 216H. *PURPOSE, STRUCTURE, & FUNCTION OF EDUCATION IN A DEMOCRACY

(3). Examines the system of education in a democratic society--past, present, and future. Historical, social, philosophical, political, legal, and economic foundations of education in Oregon, the USA, and other countries provide a framework for analyzing contemporary educational issues in schools, communities, and workplaces. (Bacc Core Course) **PREREQS:** Honors College approval required.

TCE 219. CIVIL RIGHTS AND MULTICULTURAL ISSUES IN EDUCATION (3).

Examination of the context of working with students, schools, communities, and workplaces; the diversity of learning cultures (e.g. urban, suburban, rural) and the diversity among learners within those different cultures; and the influence of culture on one's learning.

TCE 253. LEARNING ACROSS THE LIFESPAN (3).

An exploration of how learning occurs at all ages from early childhood through adulthood. Covers major and emerging theories and styles, self-reflection on implications of how learning occurs for self and others, and the impact of these issues on the development and delivery of instruction.

TCE 299. SPECIAL TOPICS (1-16).

This course is repeatable for a maximum of 16 credits.

TCE 309. FIELD PRACTICUM (3-6).

Placement in either an elementary, middle or secondary school. To assist students to develop competencies in dealing with children or adolescents according to the individual major of the university student. This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

TCE 340. ^SUPPORTIVE DIFFERENTIATED ENVIRONMENTS (3).

Addresses special abilities and needs of learners and helps prepare teachers to develop strategies and instructional practices for diverse learners and students with exceptionalities in a supportive and inclusive classroom. (Writing Intensive Course) **PREREQS:** Provisional Admission to Professional Education Program.

TCE 399. SPECIAL TOPICS (1-16).

This course is repeatable for a maximum of 16 credits.

TCE 401. RESEARCH (1-16).

This course is repeatable for a maximum of 16 credits.

TCE 402. INDEPENDENT STUDY (1-16).

This course is repeatable for a maximum of 16 credits.

TCE 403. THESIS/DISSERTATION (1-16).

This course is repeatable for a maximum of 16 credits.

TCE 405. READING AND CONFERENCE (1-16).

This course is repeatable for a maximum of 16 credits.

TCE 406. PROJECTS (1-3).

This course is repeatable for a maximum of 16 credits.

PREREQS: Departmental approval required.**TCE 407. SEMINAR (1-16).**

This course is repeatable for a maximum of 16 credits.

PREREQS: Departmental approval required.**TCE 408. WORKSHOP (1-3).**

This course is repeatable for a maximum of 16 credits.

TCE 408H. WORKSHOP (1-3).

This course is repeatable for a maximum of 16 credits.

PREREQS: Honors College approval required.**TCE 409. PRACTICUM/CLINICAL EXPERIENCE (1-16).**

This course is repeatable for a maximum of 16 credits.

TCE 410. INTERNSHIP/WORK EXPERIENCE (1-18).

This course is repeatable for a maximum of 18 credits.

TCE 411. EDUCATIONAL PSYCHOLOGY, LEARNING AND DEVELOPMENT (3).

An opportunity to begin the transition from student to teacher. Explores the relationship between human development and learning through the life cycle.

TCE 412. LEARNING STYLES AND NEEDS IN ADOLESCENCE (2).

Exploration of the particular

learning styles and needs of the adolescent, major and emerging learning theories, individual learning styles including one's own learning styles, self-reflection on implications of how learning occurs, and the impact of these issues on the development and delivery of instruction. **PREREQS:** Acceptance into Education Double Degree Program required.

TCE 416. FOUNDATIONAL PERSPECTIVES IN EDUCATION (2). Introduction to historical, philosophical, social, and political foundations of education in America providing the framework for analysis of educational issues. **PREREQS:** Admission to the Professional Teacher Education Program or instructor approval required.

TCE 419. MULTICULTURAL ISSUES IN EDUCATION (2). Overview of issues particular to an increasingly diverse student population in public schools. Implications concerning curriculum design, management, parent/teacher interactions, student/teacher interactions. **PREREQS:** Admission to the Professional Teacher Education Program or instructor approval required.

TCE 424. TEACHER AS REFLECTIVE PRACTITIONER (2-3). Designed to help teachers make complex judgements based upon their knowledge and understanding of their students, the curriculum, and larger social and cultural issues through reflective practice. Problem solving related to teaching with strong focus on generating new knowledge about teaching, learning, and assessment. This course is repeatable for a maximum of 3 credits. **PREREQS:** TCE 407

TCE 425. CURRICULUM IMPLEMENTATION AND INSTRUCTIONAL STRATEGIES 7-12 (4). The relationship of theory to practice in teaching the content areas in grades 7-12 is examined. General curriculum trends as well as content selection in specific endorsement/subject areas are explored. This course is preparation for and is coordinated with part-time student teaching. **PREREQS:** 1) Admission into the Education Double Degree. 2) Student is entering part-time student teaching in high school or middle school.

TCE 427. ALTERNATIVE ASSESSMENT FOR MIDDLE AND HIGH SCHOOL TEACHING (2). Introduces methods of assessment that encourage effective learning. Students will design assessments aligned to national, state, and local standards as they prepare and implement a teaching unit in their practicum. Taken concurrently with TCE 410, Part-Time Student Teaching in Middle or High School. **PREREQS:** Provisional admission (Level II) to the Education Double Degree Program and (TCE 491 or TCE 494). **COREQS:** TCE 407, TCE 410

TCE 456. STRATEGIES FOR TEACHING LANGUAGE ARTS AND SOCIAL STUDIES (2). Exploration of language arts and social studies programs (e.g., children's literature, writing, special needs, spelling, and cultural factors). Development of research-based teaching strategies and assessment. Focuses on the development of inquiry approaches that reflect interdisciplinary curriculum as well as subject-specific pedagogy in the teaching of both social studies and language arts. **PREREQS:** TCE 216 and TCE 219 and TCE 253 and provisional acceptance into the Education Double Degree Program required.

TCE 457. TEACHING ELEMENTARY MATHEMATICS FOR UNDERSTANDING (3). Part of the Education Double Degree. Explores the teaching of mathematics in K-8 classrooms in a manner consistent with state and national standards. Students learn teaching strategies that incorporate the development of mathematical models and mental constructs. **PREREQS:** Admission to Provisional Level (Level II) of the Elementary Double Degree Program. (MTH 211 and MTH 212 and MTH 390)

TCE 458. STRATEGIES FOR TEACHING WELLNESS AND FINE ARTS (2). Exploration of recent trends in wellness and fine arts.

Development of research-based practices in the teaching of wellness and fine arts. Emphasizes the value of developing holistic learners through effective wellness and fine arts programs.

PREREQS: TCE 216 and TCE 219 and TCE 253 and provisional acceptance into the Education Double Degree Program required.

TCE 472. FOUNDATIONS OF ESOL/BILINGUAL EDUCATION (3). Examines characteristics of English language learners (ELLs), key theories in language acquisition, the role of culture in language development, and instructional program models for ELLs, while considering implications for classroom instruction.

TCE 473. INSTRUCTIONAL APPROACHES FOR ESOL/BILINGUAL EDUCATION (3). Examines characteristics of standards-based content-area instruction for emergent bilinguals. Includes integration of content and language development, classroom-based assessment, and use of technology to support student learning. **PREREQS:** TCE 472

TCE 476. PARTNERSHIPS AND IDEOLOGIES IN ESOL/BILINGUAL EDUCATION (3). Considers social and political issues pertaining to educating English language learners. Focuses on exploring multiple ideologies in ESOL and building partnerships across schools, families, and communities. **PREREQS:** TCE 472

TCE 479. LINGUISTICS FOR ESOL/BILINGUAL TEACHERS (3). Explores linguistic categories: phonology, morphology, syntax, semantics, pragmatics, and discourse. Focuses on teaching implications--from psycholinguistic, sociolinguistic and critical perspectives--for emergent bilingual students in P-12 contexts. **PREREQS:** TCE 472

TCE 483. DEVELOPMENTAL READING (3). Development of pedagogy in teaching of reading to elementary-aged students, including teaching of vocabulary, comprehension, phonics, fluency and motivation to read. Use of children's literature, assessment approaches, and special needs students are also addressed. This is a PTCE course in the elementary Double Degree Program. **PREREQS:** Admission to Level II (Provisional Level) of the Education Double Degree Program.

TCE 491. CONTENT STANDARDS AND CURRICULUM DEVELOPMENT FOR MID LEVEL (3). Exploration of content standards, materials, and methods appropriate for middle school students. Develops skills in work sample methodology through the design of effective instruction, integrating a variety of methods with existing understandings of content area, how people learn, and the diverse communities in which they work. **PREREQS:** Provisional acceptance into the Education Double Degree Program required.

TCE 493. READING, LITERATURE, AND LANGUAGE DEVELOPMENT IN THE CONTENT (2). Examination of reading, literature, and language development methods that can be used by middle school and high school teachers to support students' learning of content area information. Development of specific reading strategies in content areas. **PREREQS:** TCE 216 and TCE 219 and TCE 253. Provisional acceptance into the Education Double Degree Program required.

TCE 494. CONTENT STANDARDS AND CURRICULUM DEVELOPMENT FOR HIGH SCHOOL (3). Exploration of content standards, materials and methods appropriate for high school students. Develops skills in work sample methodology through the design of effective instruction, integrating a variety of methods with existing understandings of content area, how people learn, and the diverse communities in which they work. **PREREQS:** Provisional acceptance into the Education Double Degree Program required.

TCE 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

TCE 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TCE 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TCE 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

TCE 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TCE 506. PROJECTS (1-3). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TCE 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TCE 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TCE 509. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Admission to program. Departmental approval required.

TCE 510. INTERNSHIP (1-18). By special permission and arrangement. This course is repeatable for a maximum of 18 credits.

TCE 511. HUMAN DEVELOPMENT, LEARNING AND EDUCATION (3). Covers the implications in interdependence of human development and learning on educational processes. **PREREQS:** Admission to Professional Teachers Education Program or instructor approval required.

TCE 512. PSYCHOLOGY OF THE ADOLESCENT (3). Covers the research and influence of social, physical, psychomotor, intellectual, cognitive and peer relations as they relate to learning and development of the middle/secondary school student. Investigates the influence of peer groups and the environment as well as identifies at-risk youth.

TCE 513. COUNSELING PRE-PRACTICUM (3). Designed to develop competencies in basic counseling skills and processes. Self critique, peer critique, and supervisor critique of videotaped interviews with peer clients. A pass requires at least "B" level work. Graded P/N. This course is repeatable for a maximum of 6 credits. **PREREQS:** Admission to program.

TCE 514. PRACTICUM IN COUNSELING (1-3). Designed to develop competencies in basic skills, facilitative dimensions, and counseling process. Self-critique, peer-critique, and supervisor-critique of videotaped interview. Written self-critique, oral case presentation and charting skills are learned. Practicals are graded on a pass/no pass credit basis only. A pass requires at least "B" level work. This course is repeatable for a maximum of 9 credits. **PREREQS:** Admission to program. Departmental approval required.

TCE 515. COUNSELING INTERNSHIP (1-15). The internship is the culminating field experience of the MS in Counseling program. It is designed to provide the student with an on-site placement in a public or private mental health or school setting that will create the necessary bridge between training and professionalism. Graded P/N. This course is repeatable for a maximum of 24 credits.

TCE 516. FOUNDATIONAL PERSPECTIVES IN EDUCATION (2). Introduction to historical, philosophical, social, and political foundations of education in America providing the framework for analysis of educational issues.

TCE 517. ACADEMIC WRITING FOR MASTER'S STUDENTS (1). A writing refresher that addresses academic voice, style, tone, construction, conventions, and writing style appropriate for master's-level research papers and capstones.

This course is repeatable for a maximum of 2 credits.

TCE 519. MULTICULTURAL ISSUES IN EDUCATION (2). Overview of issues particular to an increasingly diverse student population in public schools. Implications concerning curriculum design, management, parent/teacher interactions, student/teacher interactions.

TCE 520. CLASSROOM MANAGEMENT AND DISCIPLINE K-12 (3). Knowledge of discipline and classroom management techniques through examination of the literature and school observations. Explore factors that influence student behavior, including those associated with social and/or multicultural student populations.

TCE 522. RACIAL AND CULTURAL HARMONY IN THE K-12 CLASSROOM (3). An overview of the many issues relevant to the increasingly diverse student population in public schools today. It explores how a culturally competent perspective can be incorporated into curriculum design, teaching strategies, and interactions with students and parents. The course is both self-directed and communal, requiring students to respond to the materials and each other, yet at their own pace.

TCE 523. STRATEGIES AND ORGANIZATIONAL STRUCTURES FOR MID LEVEL (4). Addresses the unique role of the middle school as it responds to the physical, intellectual, social and emotional development of young adolescents. Examines how middle schools can improve teaching, learning, and assessment and create school cultures that support high achievement within the various content disciplines. Incorporates work sample methodology. **PREREQS:** Acceptance into an initial licensure program required. Concurrent requirements include TCE 410/TCE 510 part-time student teaching (2 credits) and TCE 407/TCE 507 student teaching seminar (1 credit).

TCE 524. TEACHER AS REFLECTIVE PRACTITIONER (2-3). Designed to help teachers make complex judgments based upon their knowledge and understanding of their students, the curriculum, and larger social and cultural issues through reflective practice. Problem solving related to teaching with strong focus on generating new knowledge about teaching, learning, and assessment.

TCE 525. CURRICULUM IMPLEMENTATION & INSTRUCTIONAL STRATEGIES FOR HS (4). Content course that focuses on the implementation of effective and appropriate instructional strategies designed for high school students. Explores the integration of curriculum and instruction through consideration of students' diverse needs and work sample methodology. Examines the importance of metacognitive strategies in the teaching of content-related skills and concepts. **PREREQS:** Acceptance into an initial licensure program required. Concurrent requirements include TCE 410/TCE 510 part-time student teaching (2 credits) and TCE 407/TCE 507 student teaching seminar (1 credit).

TCE 527. ALTERNATIVE ASSESSMENT (2). An introduction to issues related to alternative assessment and exploration of effective strategies that holistically assess students.

TCE 528. USING ASSESSMENT TO IMPROVE INSTRUCTION (3). Addresses using assessment data to design, refine, and revise curriculum, instruction, and assessment so that all students have an opportunity to make progress toward meeting standards.

TCE 530. FUNDAMENTALS OF COUNSELING (3). A course designed for students planning on working in a human service profession, such as counseling, teaching, nursing, medicine, law. Exploration of basic helping processes appropriate in a variety of settings. Review of ethical standards of conduct. A variety of skills and techniques are demonstrated and practiced through videotape and role play.

TCE 531. DEVELOPMENTAL PERSPECTIVES IN COUNSELING (3). A study of affective, behavioral, cognitive, physical, and moral development for human growth and maturation. Theories of personality and learning that affect normal and non-normal development. Relationship of understanding human development to the counseling profession.

TCE 532. SOCIAL AND CULTURAL PERSPECTIVES IN COUNSELING (3). Social and cultural factors effecting counseling. Includes studies of change, ethnic groups, subcultures, changing roles of women, sexism, urban and rural societies, population patterns, cultural mores, use of leisure time, and differing life patterns. **PREREQS:** Admission to program.

TCE 533. ADDICTIVE BEHAVIOR COUNSELING (3). Techniques for addictive behavior assessment and counseling. Specific addictions covered include substance abuse, gambling, and eating disorders.

TCE 534. PEDIATRIC PSYCHOPHARMACOLOGY FOR SCHOOL PERSONNEL (1). Introduces schoolteachers, counselors and social workers to the fundamentals of pediatric psychopharmacology. Basics of pharmacology, adverse effects, indications, and drug interactions will be discussed. This course does not purport to prepare the student to be any part of the pharmacological prescriptive process; that is the purview of the medically trained person.

TCE 536. APPLIED PSYCHOPHARMACOLOGY FOR COUNSELORS (3). Acquaints counseling students with the fundamentals of psychotropic drugs. Basics of pharmacology, adverse effects, indications, and drug interactions will be discussed. Boundaries of practice and practical issues of assessment and referral will be covered. The overall aim of the course is to provide information about psychopharmacology to the non-medical mental health care provider so that she or he can be a more informed member of the mental health care team. This course does not purport to prepare the student to be any part of the pharmacological prescriptive process. This is the purview of the medically trained person.

TCE 540. NEW VISION SCHOOL COUNSELING: ACADEMIC ACHIEVEMENT (3). Participants will be able to implement research-based educational practices in: 1. Individual and group academic achievement counseling. 2. Consulting with parents, teachers, and schools regarding academic achievement. 3. Utilizing culturally competent practices in addressing academic achievement issues. 4. Applying the appropriate legal and ethical guidelines to work in the academic domain.

TCE 541. THE COUNSELING PROFESSION (3). Provides the foundation for becoming a counselor and explores the psychological and philosophical ramifications of the counselor in a changing world. Topics will include values in counseling, ethical and legal issues in counseling, research in counseling, and maintaining a professional identity. **PREREQS:** Admission to program.

TCE 542. TEACHER LEADERSHIP (3). Examines current conceptions, research, and philosophies of educational leadership. The goal is to promote teacher-leadership in effective teaching and learning and influence in local educational policies and programs.

TCE 543. POLITICS, POLICY, AND ADVOCACY IN EDUCATION (3). Examines the relationships among local, state, and national educational governing structures, and advocacy strategies and processes.

TCE 544. LITERACY AND READING CURRICULUM DESIGN (3). Examines the theory and practice of curriculum development and related pedagogy in reading, including its integration in the content areas. Included are the study of literacy foundations, culture, development,

planning and organization, teaching heuristics, special needs and assessment.

TCE 545. PLANNING CURRICULUM ALIGNED TO STANDARDS (3). Prepares teachers to develop a yearlong curriculum that reflects level-appropriate instruction, aligned to curriculum frameworks, standards systems and assessments, and theory.

TCE 546. LEADERSHIP OF SCHOOL COUNSELING PROGRAMS (3). Designed to prepare school counselors to lead teams in the development and implementation of comprehensive school counseling programs. Principles of leadership, system change, and advocacy are introduced. State and National Comprehensive School Counseling models are examined. **PREREQS:** Admission to program.

TCE 547. FOUNDATIONS OF COMMUNITY COUNSELING (3). Addresses the foundations of community counseling including: (1) historical, philosophical, societal, cultural, economic, and political dimensions of and current trends in the community human service/mental health movement, (2) roles, functions, preparation standards, credentialing, licensure and professional identity of community counselors, (3) policies, laws, legislation, recognition, reimbursement, right-to-practice, and other issues relevant to community counseling. **PREREQS:** Admission to community counseling program.

TCE 548. SPECIAL EDUCATION ISSUES IN COUNSELING (3). Addresses various educational disability categories, the fundamentals of special education law, the special education assessment process, the special education definition of emotional/behavioral disorders, and the counselor's role in supporting children with special emotional needs. **PREREQS:** Admission to counselor education program.

TCE 549. TEACHING IN A DIFFERENTIATED AND DIVERSE CLASSROOM (3). Addresses the philosophical framework, strategies, and assessment of differentiation to meet the needs of all students in the classroom.

TCE 550. FOUNDATIONS OF MENTAL HEALTH COUNSELING (3). Addresses the foundations of mental health counseling: (1) historical, philosophical, societal, cultural, economic, and political dimensions of, and current trends in, the mental health movement; (2) roles, functions, preparation standards, credentialing, licensure and professional identity of mental health counselors, (3) policies, laws, legislation, recognition, reimbursement, right-to-practice, and other issues relevant to mental health counseling.

TCE 551. THEORY AND TECHNIQUES OF COUNSELING I (3). Basic concepts and facilitative skills of helping relationships. Introduction and overview of counseling theories and their related processes and techniques. **PREREQS:** Admission to program.

TCE 552. THEORY AND TECHNIQUES OF COUNSELING II (3). Continued development of the theories and techniques of counseling including identification of the counseling process. Emphasis on personality development and affective, behavioral and cognitive approaches. **PREREQS:** TCE 551

TCE 553. CRITICAL ISSUES IN THE TEACHING AND LEARNING OF MATHEMATICS (3). Examines National Council of Teachers of Mathematics (NCTM) principles and addresses curriculum and strategies that help ensure that all students meet the benchmarks and standards.

TCE 555. INTEGRATION OF THE DISCIPLINE (3). The student will develop an integrated unit of work for an appropriate grade level, understand how the various academic disciplines in the elementary school are integrated and can plan and teach an integrated lesson.

TCE 557. MATHEMATICS STRATEGIES K-8 (3). Exploration of the teaching of early childhood/elementary school mathematics in a manner consistent with state and national standards. **PREREQS:** Classroom teaching experience or instructor approval required.

TCE 558. CRISIS MANAGEMENT IN SCHOOLS (1). The study of crisis management in schools. Theory and practice will be the course foci.

TCE 559. STRATEGIES: SCIENCE (3). Emerging program in elementary science with emphasis on the interdependence of content and process in scientific inquiry; general, diagnostic, and prescriptive techniques in science instruction. **PREREQS:** Classroom teaching experience or instructor approval required.

TCE 560. RESEARCH IN LEARNING (3). Allows the student, through application, to use their research in learning to better structure the classroom as a learning environment; strategies for transfer; essential skills, and cognitive, affective and psychomotor development.

TCE 561. ACTION RESEARCH (1-3). Examines action research as a vehicle for teacher and administrator professional development. Specific topics of study include problem posing, data collection and analysis, theory building, and writing the report. This course is repeatable for a maximum of 3 credits.

TCE 562. INTRODUCTION TO RESEARCH METHODS IN EDUCATION (3). An introductory course for master's students as well as in-service teachers. Explains quantitative and qualitative research methods in education; classroom action research and understanding of the fundamental statistical procedures used in the interpretation and use of research studies.

TCE 563. STUDENTS WITH SPECIAL NEEDS (2). Strategies and instructional practices for diverse learners in an inclusive classroom; working with specialist, and families having children with special needs.

TCE 564. ADVANCED INSTRUCTIONAL STRATEGIES (3). Addresses research-based teaching strategies and collaboration with colleagues to improve instruction for all students in the standards-based classroom.

TCE 567. APPRAISAL OF THE INDIVIDUAL (3). Development of framework for understanding the individual; methods for data gathering and assessment; individual and group testing; case study approaches; observational, sociometric, and environmental procedures; study of individual differences. Ethnic, cultural, and sex factors are emphasized. **PREREQS:** Basic statistics course.

TCE 568. LIFESTYLE AND CAREER DEVELOPMENT (3). Major theoretical approaches to career development; available resources for educational and occupational assessment; procedures to enhance career exploration, planning and placement. Emphasis is on the decision-making process and issues of career counseling with special populations.

TCE 569. STATISTICS FOR EDUCATORS I (3). Provides education researchers with a strong understanding of basic quantitative statistical methods including probability, sample selection, descriptive statistics, and hypothesis testing in a single population for the purpose of conducting research and data-driven decision making in education settings. Taught via Ecampus only.

TCE 570. STATISTICS FOR EDUCATORS II (3). Provides education researchers with a strong understanding of basic quantitative statistical methods including probability, sample selection, descriptive statistics, and hypothesis testing in a single population for the purpose of conducting research and data-driven decision making in education settings. Taught via Ecampus only.

TCE 571. GROUP COUNSELING PROCEDURES (3). A conceptual and experiential introduction to group dynamics. Group counseling approaches

and models; issues of group leadership; styles of leadership and group facilitation skills. Consideration is given to group counseling goals, composition, phases and research. **PREREQS:** Admission to the program.

TCE 572. FOUNDATIONS OF ESOL/BILINGUAL EDUCATION (3). Examines characteristics of English language learners (ELLs), key theories in language acquisition, the role of culture in language development, and instructional program models for ELLs, while considering implications for classroom instruction.

TCE 573. INSTRUCTIONAL APPROACHES FOR ESOL/BILINGUAL EDUCATION (3). Examines characteristics of standards-based content-area instruction for emergent bilinguals. Includes integration of content and language development, classroom-based assessment, and use of technology to support student learning. **PREREQS:** TCE 572

TCE 575. FAMILY COUNSELING (3). An overview of the major theoretical approaches to family counseling will be covered. Through the use of readings, demonstrations, and videos the student will become familiar with systems foundations, the history of family counseling, family roles, interaction patterns, and decision-making processes.

TCE 576. PARTNERSHIPS AND IDEOLOGIES IN ESOL/BILINGUAL EDUCATION (3). Considers social and political issues pertaining to educating English language learners. Focuses on exploring multiple ideologies in ESOL and building partnerships across schools, families, and communities. **PREREQS:** TCE 572

TCE 577. APPLIED PSYCHOPATHOLOGY AND PSYCHODIAGNOSTICS (3). Addresses the principles of diagnosis of psychopathology and the use of current diagnostic tools, including the current edition of the Diagnostic and Statistical Manual (DSM). Includes psychiatric terminology, treatment, current research, cross-cultural impact, ethical implications, and goal planning related to mental health processes and case management. **PREREQS:** TCE 541 and TCE 551 and TCE 552

TCE 578. CRISIS, TRAUMA, AND GRIEF COUNSELING (3). The theory and pragmatics of crisis, trauma and grief counseling are addressed.

TCE 579. LINGUISTICS FOR ESOL/BILINGUAL TEACHERS (3). Explores linguistic categories: phonology, morphology, syntax, semantics, pragmatics, and discourse. Focuses on teaching implications--from psycholinguistic, sociolinguistic and critical perspectives--for emergent bilingual students in P-12 contexts. **PREREQS:** TCE 572

TCE 581. CROSS-CULTURAL COUNSELING (3). Cognitive and experimental study of social and psychological variables influencing the cross-cultural counseling relationship. Social and psychological experiences of selected subcultures. Relevant assessment instruments and current literature, methods and outcome studies. **PREREQS:** Instructor approval required.

TCE 582. SUPERVISION (3). Problems, issues, theories and practices of supervision, especially for teachers, administrators and counselors. Supervisory roles, styles, goals, and problems conceptually analyzed relative to changing demands of individuals, schools, and society. Theories of leadership, budgeting, curriculum planning, clinical techniques, group processes, teacher evaluation and related approaches to the improvement of education service and programs.

TCE 583. DEVELOPMENTAL READING (3). Developmental reading programs to K-9, specific reading skill needs, techniques, organizational strategies, materials and content area reading. Emphasis on the developmental nature of the reading process as a lifelong activity. **PREREQS:** Elementary teaching experience.

TCE 591. STUDY OF SCHOOLS: K-12 (3). Structured observation in selected K-12 school

sites. Total of 125 hours of observation, as required by the Oregon Teacher Standards and Practices Commission for persons without prior teaching experience. **PREREQS:** Admission to Track II program.

TCE 592. CLASSROOM INSTRUCTION FOR COUNSELORS (3). 75 hours of supervised instruction in a public school setting. **PREREQS:** TCE 591

TCE 593. READING AND WRITING IN THE MIDDLE AND SECONDARY SCHOOL (3). Reading and writing methods that can be used by middle/secondary school teachers to individualize instruction, correct basic reading and writing skills in content area; promote learning and the use of reading materials as supplementary teaching materials.

TCE 595. GROUP COUNSELING II (3). Group counseling theories and pragmatics for clients with mental and emotional disorders.

TCE 596. TECHNOLOGY FOR EDUCATORS (3). Explore the integration of current and emerging technologies into K-12 content areas by engaging students in real world issues and learning in a social context. Integrate technologies that promote critical thinking, communication, collaboration, and creativity. Discuss technologies in terms of cultural linguistic diversity. Gain transferrable skills. Taught via Ecampus only. **PREREQS:** Basic computer literacy.

TCE 597. INTRODUCTION TO COUNSELOR SUPERVISION (3). Introduction to the theory and pragmatics of counselor supervision.

TCE 598. COUNSELOR CONSULTATION (3). Development of consultation skills as a supervisor and counselor educator. Consultation theory and practice are studied. Students practice consultation skills and receive feedback. **PREREQS:** Admission to master's program.

TCE 599. SPECIAL TOPICS (1-3). This course is repeatable for a maximum of 90 credits. **PREREQS:** Departmental approval required.

TCE 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TCE 602. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TCE 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

TCE 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TCE 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TCE 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TCE 608. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TCE 609. PRACTICUM/CLINICAL EXPERIENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TCE 610. INTERNSHIP (1-15). This course is repeatable for a maximum of 15 credits. **PREREQS:** Departmental approval required.

TCE 612. RESEARCH PERSPECTIVES IN EDUCATION (3). Research perspectives, how they are influenced by worldviews, and how these worldviews influence research. **PREREQS:** TCE 562 and an introductory statistics course (may be taken concurrently).

TCE 613. RESEARCH ANALYSIS AND INTERPRETATION IN EDUCATION (3). Critical analysis of scholarly studies in education from a variety of research perspectives. **PREREQS:** TCE 612 and an intermediate statistics course (may be taken concurrently).

TCE 614. ADVANCED RESEARCH METHODS IN EDUCATION (1-3). Selected topics in research methods as appropriate for research perspectives in education. This course is repeatable for a maximum of 6 credits. **PREREQS:** TCE 613

TCE 616. UNIVERSITY LEVEL INSTRUCTIONAL THEORY AND METHODS (3). Addresses general university level instructional theory and methods as well as pedagogy specific to counselor education. **PREREQS:** Admission to PhD program in counseling or EdD in education.

TCE 617. ADVANCED COUNSELOR SUPERVISION (3). Advanced theory and techniques in counselor supervision. Pedagogical issues in training supervisors are addressed. **PREREQS:** Admission to PhD program in counseling.

TCE 618. PRACTICUM IN COUNSELING (1-12). Specialized counseling experiences supervised by a professional. Emphasis is on development of advanced skills in counseling specific to a population. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TCE 619. INTERNSHIP IN COUNSELING (1-12). Designed to provide experiences in development of teaching and supervision skills in preparation as a counselor educator and supervisor. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TCE 621. SELECTED TOPICS IN EDUCATION (3). This course is repeatable for a maximum of 18 credits.

TCE 632. ADVANCED COUNSELING THEORY (3). The goal of this course is to develop in each student an advanced level of understanding and skill in emergent counseling methods.

TCE 633. ADVANCED COUNSELING PRACTITIONER I (3). Assists the advanced counseling practitioner with their knowledge and skills in training, leadership, and writing.

TCE 634. ADVANCED COUNSELING PRACTITIONER II (3). Addresses the theory, science, pragmatics and pedagogy of evidence-based practices in professional counseling.

TCE 662. COUNSELOR EDUCATION QUANTITATIVE RESEARCH METHODS I (3). Part I of a three-course sequence designed to prepare students to meet the CACREP doctoral standards for quantitative research methods in counselor education. Topics addressed in course I include application of the following in counselor education research: (1) data scales and scale transformation, (2) frequency distributions and histograms, (3) measures of central position, (4) variability, (5) characteristics of data curves, (6) normality, (7) measures of variability, (8) the statistical hypothesis, (9) statistical errors (Type I/ Type II), (10) power analysis and (11) statistical correlation. **PREREQS:** TCE 562

TCE 663. COUNSELOR EDUCATION QUANTITATIVE RESEARCH METHODS II (3). Part II of a three-part course sequence designed to prepare students to meet the CACREP doctoral standards for quantitative research methods in counselor education. Topics addressed in course II include application of the following in counselor education research: (1) a review of the dependent variable, normal curve, Type I and Type II errors, power analysis, and criteria for selecting statistical tools, (2) significance tests, including Chi-square t-test, one-factor analysis of variance, multiple comparison tests (L.S.D. and Tukey's HSD), two-factor analysis of variance, statistical interaction (ordinal and disordinal), linear regression, factor

analysis, and analysis of covariance.

TCE 664. COUNSELOR EDUCATION QUANTITATIVE RESEARCH METHODS III (3). Part III of a three-course sequence designed to prepare students to meet the CACREP doctoral standards for quantitative research methods in counselor education. Topics addressed in course III include application of the following in counselor education research: (1) multiple regression, (2) path analysis, (3) confirmatory factor analysis, (4) logistic regression, (5) reliability and generalizability theory, (6) cluster analysis, (7) structural equation modeling, and (8) single subject designs.

TCE 665. PUBLICATION METHODS IN COUNSELOR EDUCATION (3). Teaches doctoral students how to write theses, grant reports, peer-reviewed journal articles, and textbook chapters.

TCE 667. ADVANCED ASSESSMENT IN COUNSELING (3). Explores current issues in the use of assessment in counseling, best practices in instrument development, and best practices in assessment pedagogy. **PREREQS:** Admission to PhD program in counselor education.

TCE 668. ADVANCED CAREER DEVELOPMENT AND CONSULTATION IN COUNSELING (3). An advanced course surveying past, current, and possible future technical and philosophical perspectives concerning career development and counseling. Issues in consultation, social change theory, and advocacy action planning are also reviewed in light of their impact on future counseling practitioners. Pedagogical methods for presenting current issues in career development, consultation, social change theory and advocacy action planning are a major focus of the class. **PREREQS:** TCE 568 and TCE 598

TCE 671. ADVANCED GROUP COUNSELING (3). Provides learning experiences beyond the entry-level in group counseling. Theoretical and pedagogical innovations in this area are discussed. **PREREQS:** Admission to doctoral program in counseling.

TCE 681. ADVANCED DIVERSITY AND SOCIAL JUSTICE IN COUNSELOR EDUCATION (3). Addresses pedagogy relevant to multicultural, diversity, and social justice issues and the role of racial, ethnic, and cultural heritage, nationality, socioeconomic status, family structure, age, gender, sexual orientation, religious and spiritual beliefs, occupation, physical, and mental status, local, regional, national, international perspective, and issues of equity such as oppression, power and privilege in counselor education. **PREREQS:** TCE 581

TCE 696. COUNSELOR EDUCATION (3). Orientation to the profession of counselor education. Specific topics include (1) history and organization of the profession, (2) program accreditation standards and practices, (3) instructional theory and methods relevant to counselor education, and (4) ethical and legal considerations in counselor education.

TCE 697. COUNSELOR SUPERVISION (3). Practical experience for counseling professionals who have responsibility for directing personal and professional development of counselors, promoting counselor competency, and developing and implementing counseling services and programs. Theoretical models of supervision are utilized to develop supervisor roles. **PREREQS:** Admission to doctoral program.

TCE 808. WORKSHOP (1-4). This course is repeatable for a maximum of 16 credits.

The College of Engineering at Oregon State University grew out of a department established in 1889. Its purpose is to provide a quality education for students entering the engineering profession. It has awarded more than 30,000 degrees. The reputation that its graduates have established in industry, business, and government through their imaginative work and leadership attests to the accomplishments of the college in providing a sound education.

The College of Engineering offers degrees in engineering, computer science, construction engineering management, energy systems engineering, and radiation health physics. Students may choose engineering majors from biological, chemical, civil, ecological, electrical and computer, environmental, industrial, manufacturing, mechanical, and nuclear engineering. Educational preparation for land surveying, a licensed profession in all states, is offered through civil engineering. Forest engineering is offered by the College of Forestry.

THE ENGINEERING PROFESSION

Engineering is the profession in which knowledge of the mathematical and natural sciences gained through education and practice is applied with judgment to develop ways to economically utilize the materials and forces of nature for the benefit of humankind. It is a licensed profession in all of the states of the USA, and educational programs must meet high professional standards. Engineers are not only responsible for planning, designing, manufacturing, construction, and management, but also for the safety and welfare of the public that relies on their work.

MISSION AND GOALS

The college's undergraduate educational mission is to provide high quality engineering programs that prepare students for successful careers, lifelong learning, and service to their profession and society. OSU engineering graduates will be known for their technical competence and creativity; for their ability to apply, adapt, and extend their knowledge to solve a wide variety of problems; and for their effective communication skills. Their education will provide them with an understanding of the ways in which the humanities, social sciences, basic sciences, and technology interact to affect society. These programs will foster an environment that stimulates learning and promotes diversity.

The college's undergraduate programs have four goals:

1. Educate students thoroughly in mathematics, basic science and engineering sciences relevant to their discipline's professional work, including fundamental concepts, experimental techniques, methods of analysis, and computational applications.
2. Develop the ability of students to communicate effectively and to work collaboratively in diverse team environments.
3. Develop in students an awareness of the historical evolution of knowledge and technical applications, the state of current professional practice,

their need for lifelong learning, contemporary issues, and the impact of engineering actions and solutions in a societal and global context; and to develop an understanding of their professional and ethical responsibilities.

4. Develop the ability of students to formulate and solve problems, to integrate and synthesize knowledge, and to think creatively, leading to the capability to analyze and design components, processes, or systems; plan and carry out experiments effectively; and troubleshoot and modify processes and systems.

PREPARING FOR AN ENGINEERING CAREER

To prepare for the practice of engineering, students complete an accredited program of study leading to a bachelor of science degree in an established engineering field. Most engineering curricula require 180 credits; exceptions include programs in chemical, ecological, environmental and bioengineering. All programs include a balance of course work in mathematics, science, liberal arts, engineering science, and engineering design.

Upon graduation, engineering students are eligible to take the Fundamentals of Engineering Examination of the State Board of Engineering Examiners in any state. After passing the examination and completing four years of progressively responsible engineering work, graduates are eligible to take the professional engineering license examination of the state in which they intend to practice.

Although some fields of industrial and government employment do not require formal professional licensure, the educational preparation for the bachelor's degree is a necessity for virtually all such employment.

Preparation for the professional practice of land surveying follows a pattern of education, experience, examination, and professional licensure similar to that required for professional engineering practice.

Students completing the BS in Radiation Health Physics degree will be eligible to take part I of the Certified Health Physics (CHP) Examination of the American Board of Health Physics after one year of applied health physics practice. After six years of responsible professional experience in health physics, graduates will be eligible to take part II of the CHP examination.

CHOOSING A MAJOR

The selection of a major is often difficult for students who have not had close association with engineering activities. Students should not be overly concerned with this problem since the pre-professional curricula of all engineering programs during the first year are essentially equivalent. This flexibility allows students to change

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majors during the first year without loss of progress. Engineering students who are unsure about their choice of a major are advised to register in pre-general engineering until they make a decision.

GRADUATE STUDY

Because of the growing complexity of modern engineering practice, graduate study is important for those students who wish to specialize. Students who have established satisfactory undergraduate records and who are looking for the greatest opportunity in their professional field should consider continuation of their education beyond the baccalaureate degree. Study for the Master of Science (MS) and Master of Engineering (MEng) degrees normally requires one or two years. The Doctor of Philosophy (PhD) degree requires three to four additional years.

ACCREDITATION

The Bachelor of Science degrees in Bioengineering, Chemical, Civil, Ecological, Electrical and Computer, Environmental, Industrial, Manufacturing, Mechanical, and Nuclear Engineering baccalaureate programs are accredited by the Engineering Accreditation Commission of the ABET, Inc. 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; 410-347-7700. The Construction Engineering Management program is accredited by the American Council for Construction Education. The Bachelor of Science degree in Computer Science-Computer Systems option is accredited by the Computing Accreditation Commission of the ABET, Inc. 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; 410-347-7700. The Bachelor of Science degree in Radiation Health Physics is accredited by the Applied Science Accreditation Commission of the ABET, Inc. 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; 410-347-7700.

PRE-PROFESSIONAL PROGRAM

Courses included in the first and sophomore years comprise a pre-professional program of study that produces a solid foundation for professional program studies at the junior, senior, and advanced degree levels. The pre-professional program may be taken at Oregon State University or at any accredited college or university that offers equivalent courses transferable to OSU.

The required pre-professional courses in the program listings are designated with an (E). These courses must be completed before the student is eligible for admission to the professional program. The other courses listed are important and may constitute prerequisites for junior-level courses.

All engineering programs have very similar required pre-professional courses.

This allows the flexibility of selecting a major after one year of study. Other majors offered by the college have different required pre-professional courses appropriate to that major.

PROFESSIONAL PROGRAM

The professional program consists of various curricula offered at the junior and senior levels that are designed to prepare students for a professional career.

Each curriculum provides an opportunity for specialization through judicious selection of elective courses; however, to become fully versed in a specialty requires additional study at the graduate level.

ADMISSION REQUIREMENTS

Pre-professional Program

Admission to the pre-professional program requires that students meet general university admission requirements, as published in the *OSU General Catalog*. Students admitted to the pre-professional program are assigned to the department or school of their choice for advising and program planning.

Professional Program

Enrollment in professional program courses is restricted to those students who have clearly demonstrated an ability to achieve the high standards required for professional studies. It is limited in each curriculum by the number of students who can be served by the faculty and the facilities of that curriculum.

Students must apply to the College of Engineering for admission to the professional program prior to the start of their junior year. To apply, grades of C or better and a minimum of 2.25 cumulative GPA must be earned in required classes. Admission will require a higher GPA if the number of students applying exceeds a program's capacity.

Students who have completed their pre-professional studies at a college or university other than Oregon State University must apply both to the OSU Office of Admissions for admission to OSU and to the College of Engineering for admission to the professional program. Application links and information on policies and programs are available from the College of Engineering.

ENGINEERING SCIENCE

Each engineering curriculum includes a number of courses that are appropriate for all engineering students. Because of their commonality, these are called engineering science courses.

Engineering sciences have their roots in mathematics and basic science and serve as a bridge between science and engineering. They involve the application of scientific methods to practical engineering situations and lead to solu-

tions of problems that are fundamental in analysis, design, and synthesis.

"Sophomore standing in engineering" refers to a student registered in an accepted program, who has completed 45 credits (with minimum grades of C), including MTH 251, MTH 252, plus three additional science or mathematics courses listed in an engineering curriculum. Many engineering courses require sophomore standing in engineering as a prerequisite.

FOREST ENGINEERING

See College of Forestry. Also see College of Forestry for information on the **Forest Engineering-Civil Engineering** program.

GENERAL ENGINEERING

The first year of the general engineering curriculum meets the requirements of all other engineering curricula except bioengineering, chemical engineering, environmental engineering, and ecological engineering, which require a different chemistry sequence. Students who have not decided upon a major are encouraged to register in general engineering during their pre-professional studies.

Curriculum

The pre-general engineering curriculum below will prepare students to enter many of the engineering department or school programs. Students may transfer into another program at any time during the first year; they must transfer by the end of the year.

Pre-General Engineering (One-year Program)

First Year

CH 201, CH 202. *Chemistry for Engineering Majors (3^F,3)
 COMM 111. *Public Speaking (3)^E
 or COMM 114. *Argument and Critical Discourse (3)^E
 ENGR 111. Engineering Orientation I (3)
 ENGR 112. Introduction to Engineering Computing (3)^E
 HHS 231. *Lifetime Fitness for Health (2)
 HHS 241-HHS 248. *Lifetime Fitness (Various activities) (1)
 or any PAC course (1-2)
 MTH 251. *Differential Calculus (4)^E
 MTH 252. Integral Calculus (4)^E
 MTH 254. Vector Calculus I (4)^E
 PH 211. *General Physics with Calculus (4)^E
 WR 121. *English Composition (3)^E
 Biological science elective (4)¹
 Perspectives (9)¹

Footnotes:

* Baccalaureate Core Course

^E Required for entry into the professional program.

¹ Must be selected to satisfy the requirements of the baccalaureate core.

COLLEGE OF ENGINEERING GRADING AND GPA REQUIREMENTS

- All technical, writing and communications courses must be taken for letter grades (A through F): C or better grades are passing.
- Pre-engineering students must have at least a 2.25 Pre-core GPA for admission to the professional program.
- Professional engineering students must have at least a 2.25 Pro-core GPA and a 2.25 institutional GPA for graduation.

The Pre- and Pro-core GPAs are computed based on AR 20 (only second grade used for repeated course). See the College of Engineering advising website for details.

SATISFACTORY ACADEMIC PROGRESS FOR PROFESSIONAL SCHOOL STUDENTS

A student in good academic standing satisfies university, college, and program academic requirements. The university may change a student's status to warning, probation, or suspension following guidelines contained in the Schedule of Classes. The College of Engineering has a similar, but independent, process for students in the professional program.

At the conclusion of each term, pro-core term and cumulative GPA are calculated and academic standings are determined for students according to the criteria outlined below. Students whose standings evidence a lack of satisfactory progress will be warned of this condition and advised to seek help from their academic advisors.

1. **Academic Warning:** Students with a term pro-core GPA below 2.25 and fewer than 10 credits of pro-core course work will be placed on academic warning. The student must meet with their academic program advisor before they will be allowed to register for subsequent terms.
2. **Academic Probation:** Students who have completed 10 or more credits of pro-core course work and have a cumulative pro-core GPA below 2.25 will be placed on academic probation. A registration hold ("dean's hold") will be placed on the student's account until the student meets with an academic program advisor. The student and academic program advisor will complete an academic success agreement.
3. **Academic Suspension:** Students who are on academic probation and fail to meet the terms of their academic success agreement will be placed on academic suspension. Students who are academically suspended are removed from the

professional program and are not allowed to take additional upper-division College of Engineering courses.

4. **Reinstatement to the College:** Suspended students may be reinstated to the professional program after one year, or completion of a minimum of 24 quarter credits of acceptable transferable college-level work at an accredited college or university, with a GPA of 2.5 or above. **These 24 credits must be pre-approved in writing by the program head advisor.** Students reinstated to the professional program who are subsequently suspended may only apply for reinstatement under the "one year" option.

Reinstatement requests from students will be considered by the College Committee on Reinstatement (CCR) made up of three College of Engineering head advisors, the director of undergraduate programs and the dean (or their designee). Reinstatement guidelines are available electronically in the College of Engineering Undergraduate Policy Manual.

GRADUATION REQUIREMENTS

To graduate with a baccalaureate degree in any of the engineering or computer science majors, a student must complete 180 credits; exceptions include programs in chemical, environmental, ecological, and bioengineering, which require 192 credits. In addition, students must have a minimum 2.25 institutional GPA and minimum 2.25 GPA in all professional core course work as defined in the respective major. A student must also meet all university degree requirements published each year in the printed and electronic "Academic Regulations and Procedures" section of the *Registration Information Handbook* and in the *General Catalog*.

INTERNATIONAL ENGINEERING MINOR

The International Engineering minor offers undergraduate engineering students an opportunity to certify their global competencies and demonstrate their understanding of the intercultural needs of modern engineers. By combining an engineering experience abroad, courses from a generalized global core, thematic elective courses, and the signature course for the minor, students may demonstrate their readiness for the increasingly global field of engineering.

Requirements

Global Core (9–12 credits)

Each course in the global core also satisfies a baccalaureate core requirement. Students may complete some of these courses to fulfill their baccalaureate core while also applying those credits to the

International Engineering minor if they choose.

- ANTH 210. *Comparative Cultures (3)
- ANTH 330. *Evolution of People, Technology, and Society (3)
- FW 325. *Global Crises in Resource Ecology (3)
- GEO 105. *Geography of the Non-Western World (3)
- PHL 205. *Ethics (4)
- PS 205. *Introduction to International Relations (4)

Engineering Abroad (0–6 credits)

Study Abroad
International Internship
Service Learning (e.g. EWB)

Thematic Electives (6–15 credits)

Courses related to the location of the abroad experience.

Signature Course (3 credits)

ENGR 399. Special Topics: Cultural Competencies for Engineering (3)

Upper-Division Credits

A minimum of 12 credits in any student's minor must be upper-division courses.

Total=27+

ENGINEERING COURSES

ENGR 111. ENGINEERING ORIENTATION I (3). Engineering as a profession, historical development, ethics, curricula and engineering careers. Introduction to problem analysis and solution, data collection, accuracy and variability. Lec/rec.

ENGR 112. INTRODUCTION TO ENGINEERING COMPUTING (3). Systematic approaches to engineering problem solving using computers. Logical analysis, flow charting, input/output design, introductory computer programming and use of engineering software. Lec/lab/rec.

ENGR 112H. INTRODUCTION TO ENGINEERING COMPUTING (3). Systematic approaches to engineering problem solving using computers. Logical analysis, flow charting, input/output design, introductory computer programming and use of engineering software. Lec/lab/rec.
PREREQS: Honors College approval required.

ENGR 199. SPECIAL TOPICS (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

ENGR 201. ELECTRICAL FUNDAMENTALS I (3). Analysis of linear circuits. Circuit laws and theorems. DC responses of circuits. Operational amplifier characteristics and applications. Lec/lab.
PREREQS: ((MTH 251 or MTH 251H) and (MTH 252 or MTH 252H)) and sophomore standing in engineering.

ENGR 202. ELECTRICAL FUNDAMENTALS II (3). Sinusoidal steady-state analysis and phasors. Application of circuit analysis to solve single-phase and three-phase circuits including power, mutual inductance, transformers and passive filters. Lec/lab. **PREREQS:** ENGR 201

ENGR 202H. ELECTRICAL FUNDAMENTALS II (3). Sinusoidal steady-state analysis and phasors. Application of circuit analysis to solve single-phase and three-phase circuits including power, mutual inductance, transformers and passive filters. Lec/lab. **PREREQS:** ENGR 201 and Honors College approval required.

ENGR 203. ELECTRICAL FUNDAMENTALS III (3). Laplace and Fourier transforms, Fourier series, Bode plots, and their application to circuit analysis. Lec/lab. **PREREQS:** (ENGR 201 and (ENGR 202 or ENGR 202H) and (MTH 256 or MTH 256H)) and sophomore standing in engineering.

ENGR 211. STATICS (3). Analysis of forces induced in structures and machines by various types of loading. Lec/rec. **PREREQS:** (MTH 252 or MTH 252H) and sophomore standing in engineering.

ENGR 211H. STATICS (3). Analysis of forces induced in structures and machines by various types of loading. Lec/rec. **PREREQS:** (MTH 252 or MTH 252H) and sophomore standing in engineering. Honors College approval required.

ENGR 212. DYNAMICS (3). Kinematics, Newton's laws of motion, and work-energy and impulse-momentum relationships applied to engineering systems. Lec/rec. **PREREQS:** (ENGR 211 or ENGR 211H) and (PH 211 or PH 211H)

ENGR 212H. DYNAMICS (3). Kinematics, Newton's laws of motion, and work-energy and impulse-momentum relationships applied to engineering systems. Lec/rec. **PREREQS:** (ENGR 211 or ENGR 211H) and (PH 211 or PH 211H) and Honors College approval required.

ENGR 213. STRENGTH OF MATERIALS (3). Properties of structural materials; analysis of stress and deformation in axially loaded members, circular shafts, and beams, and in statically indeterminate systems containing these components. Lec/rec. **PREREQS:** (ENGR 211 or ENGR 211H)

ENGR 213H. STRENGTH OF MATERIALS (3). Properties of structural materials; analysis of stress and deformation in axially loaded members, circular shafts, and beams, and in statically indeterminate systems containing these components. Lec/rec. **PREREQS:** (ENGR 211 or ENGR 211H) and Honors College approval required.

ENGR 221. THE SCIENCE, ENGINEERING AND SOCIAL IMPACT OF NANOTECHNOLOGY (3). Nanotechnology is an emerging engineering field that manipulates atoms and molecules to fabricate new materials and tiny devices. Properties of nanostructured materials, manufacturing methods, characterization methods, and impact on health and safety. Benefits and concerns about nanotechnology will be assessed. Lec/rec. **CROSSLISTED** as MATS 221. **PREREQS:** One year of college science.

ENGR 231. UNDERSTANDING ENERGY (3). Provides a basic knowledge of how the many different types of energy, e.g. mechanical, thermal, chemical, nuclear, potential, kinetic, can be compared, how energy can be converted from one form into another for convenient use, storage, or transmission, and how to assess the validity of energy claims by scientists, engineers, manufacturers, marketers, and hucksters.

ENGR 248. ENGINEERING GRAPHICS AND 3-D MODELING (3). Introduction to graphical communication theory, including freehand sketching techniques, geometric construction, multi-view, pictorial, sectional and auxiliary view representation and dimensioning techniques. Practical application of theoretical concepts using solid modeling software to capture design intent and generate engineering drawings. Lec/Lab.

ENGR 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ENGR 299H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

ENGR 321. INTRODUCTION TO MATERIALS SCIENCE (4). Crystal structure, microstructure, and physical properties of metals, ceramics, polymers, composites, and amorphous materials. Also includes elementary mechanical behavior and phase equilibria. Lec. **CROSSLISTED** as MATS 321. **PREREQS:** (CH 202 or CH 222 or CH 224H or ((CH 232 or CH 232H) and (CH 262 or CH 262H or CH 272))

ENGR 321H. INTRODUCTION TO MATERIALS SCIENCE (4). Crystal structure, microstructure, and physical properties of metals, ceramics, polymers, composites, and amorphous materials. Also includes elementary mechanical behavior and phase equilibria. Lec. **CROSSLISTED** as MATS 321. **PREREQS:** (CH 202 or CH 222 or CH 224H or ((CH 232 or CH 232H) and (CH 262 or CH 262H or CH 272)) and Honors College approval required.

ENGR 322. MECHANICAL PROPERTIES OF MATERIALS (3). Mechanical behavior of materials, relating laboratory test results to material structure, and elements of mechanical analysis. Lec/lab. **CROSSLISTED** as MATS 322. **PREREQS:** ((ENGR 213 or ENGR 213H) and (ENGR 321 or ENGR 321H or MATS 321))

ENGR 350. *SUSTAINABLE ENGINEERING (3). Examination of technological innovations and alternatives required to maintain human quality of life and environmental sustainability. (Bacc Core Course)

ENGR 350H. *SUSTAINABLE ENGINEERING (3). Examination of technological innovations and alternatives required to maintain human quality of life and environmental sustainability. (Bacc Core Course) **PREREQS:** Honors College approval required.

ENGR 363. *ENERGY MATTERS (3). Establishes a basic energy vocabulary, applies the fundamental concepts of identifying energy use and determining efficiency, and studies the implications of energy decisions in the context of traditional, alternative, and sustainable energy resources. (Bacc Core Course) **PREREQS:** MTH 112 or higher

ENGR 363H. *ENERGY MATTERS (3). Establishes a basic energy vocabulary, applies the fundamental concepts of identifying energy and determining efficiency, and studies the implications of energy decisions in the context of traditional, alternative, and sustainable energy resources. (Bacc Core Course) **PREREQS:** MTH 112 or higher

ENGR 390. ENGINEERING ECONOMY (3). Time value of money; economic study techniques, depreciation, taxes, retirement, and replacement of engineering facilities. **PREREQS:** Sophomore standing in engineering.

ENGR 391. ENGINEERING ECONOMICS AND PROJECT MANAGEMENT (3). Critical issues in the management of engineering and high-technology projects are discussed. Economic, time, and performance parameters of engineering projects are analyzed from the organizational and resource perspectives. Network optimization and simulation concepts are introduced. Fundamental engineering economics concepts are introduced and applied to planning and managing projects. **PREREQS:** Sophomore standing in engineering.

ENGR 391H. ENGINEERING ECONOMICS AND PROJECT MANAGEMENT (3). Critical issues in the management of engineering and high-technology projects are discussed. Economic, time, and performance parameters of engineering projects are analyzed from the organizational and resource perspectives. Network optimization and simulation concepts are introduced. Fundamental engineering economics concepts are introduced and applied to planning and managing projects. **PREREQS:** Sophomore standing in engineering. Honors College approval required.

ENGR 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ENGR 399H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

ENGR 407. SEMINAR (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

ENGR 407H. SEMINAR (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

ENGR 421. APPLIED ROBOTICS (4). Multidisciplinary teams of students design, build, and demonstrate a robotic system, including all sensing, computation, and actuation. The specific task, such as checkers-playing robots, changes each year, and is designed to be challenging for ambitious students. Robots will compete in a friendly competition at the end of the term. Lec/lab. **PREREQS:** College of Engineering students (pro-school or graduate students) or approval of instructor.

ENGR 440. MODERN ELECTRONICS MANUFACTURING (4). Engineering methods applied to electronics manufacturing. Wafer, semiconductor, printed circuit board, surface mount assembly. Quality systems, environmental stewardship, supply chain management, production and economic analysis. Lec/lab. **PREREQS:** ST 314 or equivalent

ENGR 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ENGR 499H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

ENGR 521. APPLIED ROBOTICS (4). Multidisciplinary teams of students design, build, and demonstrate a robotic system, including all sensing, computation, and actuation. The specific task, such as checkers-playing robots, changes each year, and is designed to be challenging for ambitious students. Robots will compete in a friendly competition at the end of the term. Lec/lab. **PREREQS:** College of Engineering students (pro-school or graduate students) or approval of instructor.

ENGR 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

BIOLOGICAL AND ECOLOGICAL ENGINEERING

John P. Bolte, Head
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Oregon State University
Corvallis, OR 97331-3906
541-737-2041
Email: info-bee@engr.orst.edu
Website: <http://bee.oregonstate.edu/>

FACULTY

Professors Bolte, Cuenca¹, English¹,
Godwin, Selker
Associate Professors Bachelet,
Chaplen¹, Ely¹, Liu, Murthy, Tullos
Assistant Professors Fan, Guzy,
Higgins, Vache

¹Licensed Professional Engineer.

Undergraduate Major

Ecological Engineering (BS, CRED, HBS)

Undergraduate Minor

Irrigation Engineering

Graduate Major

Biological and Ecological Engineering
(MEng, MS, PhD)

Graduate Areas of Concentration

Bio-based Products and Fuels
Biological Systems Analysis
Bioprocessing
Ecosystems Analysis and Modeling
Water Quality
Water Resources

Graduate Minor

Biological and Ecological Engineering

The Department of Biological and Ecological Engineering at OSU is involved in teaching, research and extended education relevant to the application of engineering analysis to biological, ecological and hydrological systems. The department has strength in graduate training and research and offers both an MS and PhD degree in Biological and Ecological Engineering. The graduate degree program is focused on the professional development of engineers and the analysis of environmental systems, hydrology and water resources. Activities within the department include water resource analysis, fate and transport of biologically relevant chemicals, bioreactor design and analysis, watershed analysis and resource management, simulation modeling of ecological and biological systems, regional and global hydrology, geographical information systems for environmental modeling, and the development of bio-based products and fuels.

ECOLOGICAL ENGINEERING (BS, CRED, HBS)

Ecological engineering is the design of sustainable systems consistent with ecological principles that integrate human activities into the natural environment to the benefit of both. This approach emphasizes diversity, resilience and adaptation to maintain sustainability. Ecological engineering deals with both fundamental processes and engineering applications on scales that range from microscopic to watersheds and beyond. This discipline is rapidly developing as an important new area of engineering based on the science of ecological systems, with a number of dedicated journals, national and international professional societies, and new application areas emerging over the last decade. The Biological and Ecological Engineering Department at OSU has considerable expertise in this area and is among the national leaders in this discipline.

The Bachelor of Science degree in Ecological Engineering (EcoE) program is the first of its kind nationally, reflecting Oregon's leadership in this new and exciting multidisciplinary field. The curriculum is divided into an ecological engineering core and a set of option tracks. The ecological engineering core contains the introductory and upper-division course work that provides the common engineering and scientific basis for our students. The core consists of pre-professional courses, baccalaureate core requirements, upper-division engineering courses; and EcoE undergraduate program required science courses.

The program has three tracks:

- Ecosystems Forensics
- Ecosystems Restoration
- Water Resources

Graduates with an Ecological Engineering degree will work to optimize the interface between humankind and the environment. Specific activities undertaken might include riparian restoration, optimizing sensor arrays for ecological monitoring, improving agricultural water quality, mitigating toxic materials migration from landfills, developing sustainable industrial systems (agricultural and otherwise), developing closed systems for space travel, or dealing with issues associated with global climate change. Oregon State University has strong programs in many of the basic and engineering sciences that underpin the Ecological Engineering degree program.

Graduates with an ecological engineering skill set may find employment with industrial clients, engineering consulting companies, governmental agencies, and entrepreneurial start-ups.

For further information, please contact:

John P. Bolte

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Website: <http://bee.oregonstate.edu/>

Core Requirements

Pre-Professional Courses (87 credits)

(Pre-Ecological Engineering, major code 654)

BEE 101 Ecological Engineering I (3)
BEE 102. Ecological Engineering II (3)
CH 231. *General Chemistry (4)
and CH 261. *Laboratory for Chemistry 231 (1)
COMM 111. *Public Speaking (3)
or COMM 114. *Argument and Critical Discourse (3)
ENGR 211. Statics (3)
ENGR 213. Strength of Materials (3)
ENGR 320. Biosystems Analysis and Modeling (3)
ENGR 390. Engineering Economy (3)
HHS 231. *Lifetime Fitness for Health (2)
and HHS 241–248. *Lifetime Fitness (various activities) (1)
or any PAC course (1–2)
MTH 251. *Differential Calculus (4)
MTH 252. Integral Calculus (4)
MTH 254. Vector Calculus I (4)
MTH 256. Applied Differential Equations (4)
MTH 306. Matrix and Power Series Methods (4)
PH 211, PH 212, PH 213. *General Physics with Calculus (4,4,4)
ST 421/ST 521. Introduction to Mathematical Statistics (4)
WR 121. *English Composition (3)
WR 327. *Technical Writing (3)
Cultural Diversity (3)
Difference, Power, and Discrimination (3)
Literature and the Arts (3)
Social Processes and Institutions (3)
Western Culture (3)

Professional Courses (73 credits)

BEE 320. Biosystems Analysis and Modeling (4)
BEE 322. Thermodynamics and Transfer Processes (4)
BEE 429. Biosystems Modeling Techniques (3)
BEE 461. Ecological Engineering Lab (3)
BEE 469. ^Ecological Engineering Design I (4)
BEE 470. Ecological Engineering Design II (4)
BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)
BI 301. *Human Impacts on Ecosystems (3)
BI 370. Ecology (3)
CE 311. Fluid Mechanics (4)
CE 313. Hydraulic Engineering (4)
CE 412. Hydrology (4)
CH 232, CH 233. *General Chemistry (4,4) and CH 262, CH 263. *Laboratory for Chemistry 232, 233 (1,1)
CSS 305. Principles of Soil Science (4)
[Taught at EOU LaGrande campus only.]
or SOIL 205. *Soil Science (4)
ENGR 350. *Sustainable Engineering (3)
FW 456/556. Limnology (5)

Tracks**Ecosystems Forensics Track****(Select 33 credits from below):**

AREC 351. *Natural Resource Economics and Policy (3)
 AREC 432. Environmental Law (4)
 CE 372. Geotechnical Engineering I (3)
 CE 413. GIS in Water Resources (3)
 CH 331, CH 332. Organic Chemistry (4,4)
 CH 390. Environmental Chemistry (3)
 CSS/SOIL 455. Biology of Soil Ecosystems (4)
 ENVE 321. Environmental Engineering Fundamentals (4)
 ENVE 421. Water and Wastewater Characterization (4)
 ENVE 422. Environmental Engineering Design (4)
 ENVE 431. Fate and Transport Chemicals Environmental Systems (4)
 FE 315. Soil Engineering (4)
 FE 430. Watershed Processes (4)
 FES/FW 445. Ecological Restoration (4)
 FW 479. Wetlands and Riparian Ecology (3)
 GEO 202. *Earth Systems Science (4)
 GEO 322. Surface Processes (4)
 GEO 432. Applied Geomorphology (3)
 OC 430. Principles of Physical Oceanography (4)
 OC 440. Introduction to Biological Oceanography (3)
 OC 450. Chemical Oceanography (3)
 ST 422. Introduction to Mathematical Statistics (4)
 TOX 430. Chemical Behavior in the Environment (3)
 TOX 455. Ecotoxicology: Aquatic Ecosystems (3)

Ecosystems Restoration Track**(Select 33 credits from below):**

BEE 446. River Engineering (4)
 BOT 331. Plant Physiology (4)
 BOT 341. Plant Ecology (4)
 BOT 442. Plant Population Ecology (3)
 CE 372. Geotechnical Engineering I (4)
 CSS 315. ^Nutrient Management and Cycling (4)
 CSS/SOIL 455. Biology of Soil Ecosystems (4)
 ENVE 321. Environmental Engineering Fundamentals (4)
 ENVE 421. Water and Wastewater Characterization (4)
 ENVE 422. Environmental Engineering Design (4)
 ENVE 431. Fate and Transport of Chemicals Environmental Systems (4)
 FE 315. Soil Engineering (4)
 FE 316. Soil Mechanics (4)
 FE 357. GIS and Forest Engineering Applications (3)
 FE 434. Forest Watershed Management (4)
 FES 240. *Forest Biology (4)
 FES/FW 445. Ecological Restoration (4)
 FW 479. Wetlands and Riparian Ecology (3)
 RNG 341. Rangeland Ecology and Management (3)
 RNG 352. Grassland and Shrubland Ecosystems (4)
 RNG 421. Wildland Restoration and Ecology (4)
 RNG 550. Landscape Ecology and Analysis (3)
 ST 422. Introduction to Mathematical Statistics (4)

Water Resources Track**(Select 33 credits from below):**

AREC 351. *Natural Resource Economics and Policy (3)
 AREC 432. Environmental Law (4)
 BEE 433. Irrigation System Design (4)
 BEE 446. River Engineering (4)
 CE 372. Geotechnical Engineering I (4)
 CE 413. GIS in Water Resources (3)
 CSS 315. ^Nutrient Management and Cycling (4) [Taught at EOU LaGrande campus only.]
 ENVE 321. Environmental Engineering Fundamentals (4)
 ENVE 421. Water and Wastewater Characterization (4)
 ENVE 431. Fate and Transport of Chemicals Environmental Systems (4)
 ENVE 456. Sustainable Water Resources Development (3)
 FE 357. GIS and Forest Engineering Applications (3)
 FE 430. Watershed Processes (4)
 FE 434. Forest Watershed Management (4)
 FW 479. Wetlands and Riparian Ecology (3)
 GEO 202. *Earth Systems Science (4)
 GEO 322. Surface Processes (4)
 GEO 432. Applied Geomorphology (3)
 OC 440. Introduction to Biological Oceanography (3)
 RNG 341. Rangeland Ecology and Management (3)
 RNG 355. Desert Watershed Management (3)
 RNG 421. Wildland Restoration and Ecology (4)
 RNG 455. Riparian Ecology and Management (3)
 ST 422. Introduction to Mathematical Statistics (4)
 Z 477. Aquatic Entomology (4)

Total Credits for EcoE Degree=192**Baccalaureate Core Course Options****Suggested Cultural Diversity Courses:**

ANTH 210. *Comparative Cultures (3)
 ES 101. *Introduction to Ethnic Studies (3)
 GEO 105. *Geography of the Non-western World (3)
 PHL 160. *Quests for Meaning: World Religions (4)
 WGSS 280. *Women Worldwide (3)

Suggested Difference, Power, and Discrimination Courses:

AG 301. *Ecosystem Science of Pacific NW Indians (3)
 FW 340. *Multicultural Perspectives in Natural Resources (3)
 GEO 309. *Environmental Justice (3)
 PHL 280. *Ethics of Diversity (4)
 SOC 206. *Social Problems and Issues (3)
 SOC 360. *Population Trends and Policy (4)
 SOC 426. *Social Inequality (4)
 WGSS 223. *Women: Self, and Society (3)
 WGSS 224. *Women: Personal and Social Change (3)

Suggested Social Processes and Institutions Courses:

AREC 250. *Introduction to Environmental Economics and Policy (3)
 ECON 201. *Introduction to Microeconomics (3)
 PS 201. *Introduction to United States Government and Politics (4)

PS 204. *Introduction to Comparative Politics (4)
 PSY 201. *General Psychology (3)
 PSY 202. *General Psychology (3)
 SOC 204. *Introduction to Sociology (3)
 SOC 205. *Institutions and Social Change (3)

Suggested Western Culture Courses:

AREC 253. *Environmental Law, Policy, and Economics (4)
 PHL 201. *Introduction to Philosophy (4)
 PHL 205. *Ethics (4)
 PHL 207. *Political Philosophy (4)
 PHL 251. *Knowers, Knowing, and the Known (4)
 PS 206. *Introduction to Political Thought (4)

IRRIGATION ENGINEERING MINOR

The Irrigation Engineering minor is available to any undergraduate student accepted into the professional engineering program. It exposes engineering students to agricultural, biological, and engineering sciences needed to specialize in agricultural and food-related industries.

Engineering (17)**Required**

BEE 433. Irrigation System Design (4)
 CE 311. Fluid Mechanics (4)
 CE 313. Hydraulic Engineering (4)

Electives

BEE 529. Biosystems Modeling Techniques (3)
 CE 412. Hydrology (4)
 CE 417. Hydraulic Engineering Design (4)
 ST 314. Introduction to Statistics for Engineers (3)

Science (13)**Required**

CSS 200. Crop Science Basics (3)
 CSS 305. Principles of Soil Science (4) [Taught at EOU La Grande campus only.] or SOIL 205. *Principles of Soil Science (4)
 CSS 306. Problem Solving: Soil Science Applications (1)[Taught at EOU La Grande campus only.]

Electives

BI 212. *Principles of Biology (4)
 BOT 331. Plant Physiology (5)
 MB 230. *Introductory Microbiology (4)

Total=30**BIOLOGICAL AND ECOLOGICAL ENGINEERING (MEng, MS, PhD)****Graduate Areas of Concentration**

Bio-based products and fuels, bioprocessing, biological systems analysis, ecosystems analysis and modeling, water quality, water resources

The Department of Biological and Ecological Engineering offers graduate programs leading to the Master of Engineering, Master of Science, and Doctor of Philosophy degrees.

The Biological and Ecological Engineering program serves at the interface of life sciences and engineering. Biore-source engineering is the application of engineering and life science principles

and problem-solving techniques to the optimum use and sustainability of biological resources. The curriculum is engineering-based with strong emphasis on the life sciences. Courses focus on biological systems modeling, bioprocess engineering, thermophysical and molecular properties of biological materials, regional hydrologic analysis, groundwater systems, irrigation and water resource optimization. The department concentrates its research effort on two major thrusts: bioprocess engineering and water resources engineering. Specific research topics include biosensors, molecular-level biosystems analysis, nanosensors, microbial fuel cells, biological hydrogen production, and bio-based products and fuels. Research topics in water resources engineering include constructed wetland treatment systems, crop growth modeling, optimum irrigation management, crop-water requirements, groundwater and subsurface contaminant transport, hydrologic modeling, agricultural and ecological systems analysis, geographical information systems, artificial intelligence technologies, livestock production odor control, livestock waste treatment, and non-point source water pollution control.

For more information write: John P. Bolte, Head, Department of Biological and Ecological Engineering, OSU, Corvallis, OR 97331-3906.

BIOLOGICAL AND ECOLOGICAL ENGINEERING GRADUATE MINOR

For more details, see the departmental advisor.

COURSES

BEE 101. ECOLOGICAL ENGINEERING I (3). Introduction to engineering at OSU and the emerging field of ecological engineering. Topics include engineering analysis and problem solving, professional ethics, the design process and teamwork.

BEE 102. ECOLOGICAL ENGINEERING II (3). Introduction to common problems and solutions in ecological engineering, emphasizing the multiplicity of approaches to constraining, analyzing, and resolving challenges of ecosystem management. Two overnight field trips to local ecological monitoring and engineering sites will be required.

BEE 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

BEE 221. FUNDAMENTALS OF ECOLOGICAL ENGINEERING (3). Introduction to the concepts and practice of ecological engineering including characteristics, classification, and modeling of ecosystems; ecosystem protection; and sustainable uses of ecosystems, including treatment wetlands, land treatment systems, and ecologically sensitive stormwater management, to meet the needs of human societies. **PREREQS:** One year of college biology and chemistry and MTH 256 or instructor approval required.

BEE 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

BEE 311. ECOLOGICAL FLUID MECHANICS (4). Fluid properties, fluid statics, fluid motion,

conservation of mass, momentum and energy for incompressible fluids, dimensional analysis, ecological engineering applications. Lec/rec. **PREREQS:** Consent of instructor.

BEE 320. BIOSYSTEMS ANALYSIS AND MODELING (4). An introduction to simulation modeling and analysis of a variety of biological and ecological systems. Systems approaches to describing ecological systems. **PREREQS:** MTH 256 and consent of instructor.

BEE 322. ECOLOGICAL ENGINEERING THERMODYNAMICS AND TRANSFER PROCESS (4). A study of the transport processes of fluid flow, heat transfer and mass transfer applied to biological organisms and ecological systems. **PREREQS:** BEE 320

BEE 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

BEE 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

BEE 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

BEE 407. SEMINAR (1-16). Departmental seminars. Graded P/N. This course is repeatable for a maximum of 16 credits.

BEE 407H. SEMINAR (1-16). Departmental seminars. Graded P/N. This course is repeatable for a maximum of 16 credits.

BEE 410. ECOLOGICAL ENGINEERING INTERNSHIP (1-12). Internship in ecological engineering to provide students with an opportunity to apply course work and theory to the real world. Requires internship opportunity identification by student. Graded P/N. This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

BEE 411. GLOBAL ENVIRONMENTAL CHANGE: USING DATA TO INFORM DECISIONS (3). Empowers students interested in global change research to focus on the interactions between changes in human land use and climate. Using an innovative online data and mapping tool called Data Basin, students will explore topics accessing the highest quality datasets available in an all-in-one platform.

BEE 415. PROFESSIONAL DEVELOPMENT (1). Preparation for student professional careers. Students will interact with and hear seminars from professionals working in the ecological engineering field to learn from their experiences. **PREREQS:** Junior or senior standing.

BEE 433. IRRIGATION SYSTEM DESIGN (4). Principles of soil physics and plant water use applied to irrigation system design. Design of gravity, pressurized, and trickle irrigation systems, improving on-farm water management, performance characteristics of pumps and other irrigation equipment. Lec/lab. Offered alternate years.

BEE 439. IRRIGATION PRINCIPLES AND PRACTICES (4). Survey of irrigation systems, system configurations, factors that influence irrigation efficiency, crop water requirements, energy requirements, pumps, irrigation scheduling. For non-engineers. Lec/lab/rec. **PREREQS:** MTH 111

BEE 446. RIVER ENGINEERING (4). Multipurpose river use; natural physical processes in alluvial rivers; channel modification practices; river structures; design practices; impact of river modification; problem analysis; and impact minimization. Offered alternate years. **PREREQS:** CE 313

BEE 453. INTRODUCTION TO PROCESS ENGINEERING DESIGN (4). An integrated lecture/laboratory course focused on process engineering design and scale-up for scientists. Applies fundamental principles from BEE 452/BEE 552. Directed at food scientists and other majors

who need or would like a working knowledge of applied process engineering design. Lec/lab. **PREREQS:** (BEE 452 or BEE 552) and ST 351 and instructor consent.

BEE 458. NONPOINT SOURCE POLLUTION ASSESSMENT AND CONTROL (3). Problem solving in nonpoint source pollution. Methods for evaluating the extent, rate, timing, and fate of Non-Point Source (NPS) pollutants in agricultural and urban environments.

BEE 461. ECOLOGICAL ENGINEERING LABORATORY (3). Introduction to modern measurement methods for ecological applications, includes sensors and systems for measuring soil, water and atmospheric properties. Lec/lab. **PREREQS:** One year college physics.

BEE 468. BIOREMEDIATION ENGINEERING (3). Examines strategies for using a variety of biological processes for treating municipal, agricultural and industrial contaminants. **PREREQS:** MTH 251 and professional school or graduate standing.

BEE 469. ^ ECOLOGICAL ENGINEERING DESIGN I (4). Engineering design processes for ecological engineering applications, including specifications, performance criteria, timelines, and project logistics, principles and practices of working in engineering teams. (Writing Intensive Course) **PREREQS:** BEE 322 and (ENGR 391 or ENGR 391H), senior standing or consent of instructor.

BEE 470. ECOLOGICAL ENGINEERING DESIGN II (4). Engineering design processes for ecological engineering applications, including specifications, performance criteria, timelines, and project logistics, principles and practices of working in engineering teams.

BEE 472. INTRODUCTION TO FOOD ENGINEERING PRINCIPLES (5). Fundamental engineering principles for scientists and non-process engineers. Topics include fluid flow, mass and energy transfer, and material and energy balances. Directed at food scientists and other majors who need or would like a working knowledge of food engineering principles. **PREREQS:** (MTH 241 or MTH 251) and PH 201 or instructor consent.

BEE 473. INTRODUCTION TO FOOD ENGINEERING PROCESS DESIGN (3). Fundamental engineering process design principles for food scientists and non-process engineers. Directed at those who need or would like a working knowledge of applied food engineering process design. Lec/rec. **PREREQS:** (BEE 472 or BEE 572) and consent of instructor.

BEE 480. BIOPRODUCT ENGINEERING (3). Introduction to production of bioethanol, biodiesel, natural fibers and other high value products from renewable resources. Bioprocess systems, system components, bioseparation, purification, and byproduct analysis will be covered.

BEE 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

BEE 499H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

BEE 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

BEE 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

BEE 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

BEE 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

BEE 507. SEMINAR (1). Section 1: Graduate Student Orientation Seminar to acquaint new graduate students with graduate school and departmental requirements, policies and expectations, and departmental research

programs. Section 2: Graduate Research Publication Seminar to expose students to requirements for successful proposals and publication of research results. Section 3: Oral Presentation Improvement--A highly participatory educational effort designed to improve performance in presenting research reports, technical papers and in responding to oral examination questions. Graded P/N. This course is repeatable for a maximum of 99 credits.

BEE 511. GLOBAL ENVIRONMENTAL CHANGE: USING DATA TO INFORM DECISIONS (3). Empowers students interested in global change research to focus on the interactions between changes in human land use and climate. Using an innovative online data and mapping tool called Data Basin, students will explore topics accessing the highest quality datasets available in an all-in-one platform.

BEE 512. PHYSICAL HYDROLOGY (3). Principles of hydrologic processes and the integration of these processes into the hydrologic cycle. Topics include atmospheric processes, precipitation and runoff, storm response in streamflow on a watershed scale, and major concepts in groundwater systems. **PREREQS:** One year of calculus.

BEE 514. GROUNDWATER HYDRAULICS (3). Principles of groundwater flow and chemical transport in confined and unconfined aquifers, aquifer testing and well construction. Design and dewatering and contaminant recovery systems, properties of aquifers. **CROSSLISTED** as CE 514 and GEO 514. **PREREQS:** MTH 252

BEE 525. STOCHASTIC HYDROLOGY (3). Study the elements of randomness embedded in the hydrological processes with emphasis on time series analysis, stationarity, periodic/trend component, stochastic component, time series synthesis, ARMA model, spatial sampling and scale variability. Offered alternate years. **PREREQS:** BEE 512

BEE 529. BIOSYSTEMS MODELING TECHNIQUES (3). Development of mathematical models of biological and ecological systems; linear and nonlinear systems analysis; stochastic modeling and random processes; model solution and analysis techniques.

BEE 533. IRRIGATION SYSTEM DESIGN (4). Principles of soil and plant water use applied to irrigation system design. Design of gravity, pressurized, and trickle irrigation systems, improving on-farm water management, performance characteristics of pumps and other irrigation equipment. Lec/lab. Offered alternate years. **PREREQS:** ENGR 332

BEE 542. VADOSE ZONE TRANSPORT (4). Introduction to the physical and hydraulic properties involved in flow from the soil surface to groundwater. Classical infiltration equations will be derived and presented with exact and approximate solutions. Attention is focused on application to pollutant transport and recent advances in non-ideal flow. **PREREQS:** MTH 254

BEE 544. OPEN CHANNEL HYDRAULICS (4). Steady, uniform, and nonuniform flow in natural and artificial open channels; unsteady flow; interaction of flow with river structures; and computational methods. Offered alternate years. **PREREQS:** CE 313

BEE 545. SEDIMENT TRANSPORT (4). Principles of sediment erosion, transportation and deposition in rivers, reservoirs, and estuaries; measurement, analysis, and computational techniques. Offered alternate years. **PREREQS:** CE 313

BEE 546. RIVER ENGINEERING (4). Multipurpose river use; natural physical processes in alluvial rivers; channel modification practices; river structures; design practices; impact of river modification; problem analysis; and impact minimization. Offered alternate years. **PREREQS:** CE 313

BEE 549. REGIONAL HYDROLOGIC MODELING (3). Challenges in regional-scale water resource analysis and management with emphasis on application to production agriculture. Application of geostatistical techniques to spatially variable systems and remote sensing to large-scale water resource systems. Development of soil-water-atmosphere-plant models. Analysis of evapotranspiration estimating methods. Offered alternate years. **PREREQS:** BEE 512 and MTH 256

BEE 553. INTRODUCTION TO PROCESS ENGINEERING DESIGN (4). An integrated lecture/laboratory course focused on process engineering design and scale-up for scientists. Applies fundamental principles from BEE 452/BEE 552. Directed at food scientists and other majors who need or would like a working knowledge of applied process engineering design. Lec/lab. **PREREQS:** (BEE 452 or BEE 552) and ST 351 and instructor consent.

BEE 558. NONPOINT SOURCE POLLUTION ASSESSMENT AND CONTROL (3). Problem solving in nonpoint source pollution. Methods for evaluating the extent, rate, timing, and fate of Non-Point Source (NPS) pollutants in agricultural and urban environments.

BEE 561. ECOLOGICAL ENGINEERING LABORATORY (3). Introduction to modern measurement methods for ecological applications, includes sensors and systems for measuring soil, water and atmospheric properties. Lec/lab. **PREREQS:** One year college physics.

BEE 568. BIOREMEDIATION ENGINEERING (3). Examines strategies for using a variety of biological processes for treating municipal, agricultural and industrial contaminants. **PREREQS:** MTH 251 and professional school or graduate standing.

BEE 572. INTRODUCTION TO FOOD ENGINEERING PRINCIPLES (5). Fundamental engineering principles for scientists and non-process engineers. Topics include fluid flow, mass and energy transfer, and material and energy balances. Directed at food scientists and other majors who need or would like a working knowledge of process engineering principles. **PREREQS:** (MTH 241 or MTH 251) and PH 201 or instructor consent.

BEE 573. INTRODUCTION TO FOOD ENGINEERING PROCESS DESIGN (3). Fundamental engineering process design principles for food scientists and non-process engineers. Directed at those who need or would like a working knowledge of applied food engineering process design. Lec/rec. **PREREQS:** (BEE 472 or BEE 572) and consent of instructor.

BEE 580. BIOPRODUCT ENGINEERING (3). Introduction to production of bioethanol, biodiesel, natural fibers and other high value products from biorenewable resources. Bioprocess systems, system components, bioseparation, purification, and byproduct analysis will be covered.

BEE 585. METABOLIC ENGINEERING (3). Mathematical and experimental techniques for quantitative descriptions of microbial bioreaction processes and an introduction to the principles and methodologies of metabolic engineering. **PREREQS:** Differential equations and linear algebra and biochemistry.

BEE 590. BIOPROCESS CONTROL SYSTEMS (3). Analysis and control of biological and biochemical systems. Stability, observability, controllability, pole-placement methods. Introduction to optimal control and feed back systems. **PREREQS:** MTH 251 and MTH 306 and BEE 571 or equivalent.

BEE 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

BEE 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

BEE 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

BEE 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

BEE 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

BEE 607. SEMINAR (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

BEE 690. ADVANCED BIOPRODUCTS SYSTEMS-FEEDSTOCKS (1). Issues involved in selection of feedstocks based on suitability, availability, sustainability and economic potential. Technologies for bioprocessing for fuels and chemical feedstocks.

BEE 691. MICROBIAL FUEL CELLS (2). Fundamentals of microbial fuel cells. MFC reactor configuration. Potential applications of MFC. Comparison with other H₂ generation technologies.

BEE 693. ADVANCED BIOPRODUCTS SYSTEMS-ETHANOL PRODUCTION (2). Overview of ethanol production from bioproducts. Fermentation technologies for ethanol production. Fermentation of starch-based and lignocellulosic feedstocks.

BEE 699. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

NUCLEAR ENGINEERING AND RADIATION HEALTH PHYSICS

EAC/ABET Accredited

Kathryn A. Higley, *Department Head, Radiation Health Physics Program Coordinator*
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FACULTY

Professors Hamby, Higley⁹, Klein¹, Palmer, Reyes¹, Wu

Associate Professors Paulenova, Woods

Assistant Professors Farsoni, Marcum, Tack, Yang

Instructor Reese⁹

Emeriti Binney^{1,9}, Johnson, Ringle, Robinson¹

¹Licensed Professional Engineer

⁹Certified Health Physicist

Undergraduate Majors

Nuclear Engineering (BS, CRED, HBS)
Radiation Health Physics (BS, CRED, HBS)

Option

Radiation Health Physics–Pre Med

Minors

Nuclear Engineering
Radiation Health Physics

Graduate Majors

Medical Physics (MMP, MS, PhD)

Graduate Areas of Concentration

Medical Health Physics

Therapeutic Radiologic Physics

Nuclear Engineering (MEng, MS, PhD)

Graduate Areas of Concentration

Application of Nuclear Techniques

Arms Control Technology

Nuclear Instrumentation and Applications

Nuclear Medicine

Nuclear Power Generation

Nuclear Reactor Engineering

Nuclear Systems Design and Modeling

Nuclear Waste Management

Numerical Methods For Reactor Analysis

Radiation Shielding

Radioisotope Production

Space Nuclear Power

Thermal Hydraulics

Radiation Health Physics (MA, MHP, MS, PhD)

Graduate Areas of Concentration

Application of Nuclear Techniques

Boron Neutron Capture Therapy

Emergency Response Planning

Environmental Monitoring
Environmental Pathways Assessment
Nuclear Medicine
Radiation Detection and Instrumentation
Radiation Dosimetry
Radiation Shielding
Radioactive Material Transport
Radioactive Waste Management
Research Reactor Health Physics
Risk Assessment

Graduate Minors

Medical Physics
Nuclear Engineering
Radiation Health Physics

The Department of Nuclear Engineering and Radiation Health Physics at Oregon State University offers BS, MEng, MS, and PhD degrees in Nuclear Engineering. In addition, it offers a BS, MS, MHP (Master of Health Physics) degrees in Radiation Health Physics and an MMP (Master of Medical Physics), MS, and PhD in Medical Physics. The BS in Radiation Health Physics degree may also be taken as a premedical track.

Excellent facilities are available for the instructional and research programs at the Radiation Center, including a TRIGA Mark II nuclear reactor and the AP-600 1/4 scale test facility. Instruction is integrated with an extensive research program, with opportunities to participate at both the undergraduate and graduate levels.

The mission of the Department of Nuclear Engineering and Radiation Health Physics is to educate students to become nuclear engineers and health physicists with the ability to achieve the highest standards of the profession and to support the needs of industry, government, and the nation.

The nuclear engineering undergraduate program objectives are:

1. To produce graduates with a high level of competency in the nuclear engineering core curriculum.
2. To produce graduates with a high level of competency in engineering and science.
3. To produce graduates that can work effectively in both individual and team environments.
4. To produce graduates with effective communication skills.
5. To produce graduates with a high regard for their profession and their responsibility to lifelong learning.

The objectives of the nuclear engineering and radiation health physics undergraduate curricula are to prepare students for careers related to the many beneficial uses of nuclear technology and energy. Nuclear engineers apply scientific principles to the research, design, and operation of a wide variety of nuclear

technology applications including power generation, medicine, and radioactive waste management. Radiation health physicists study methods used to protect people and their environment from radiation hazards while enabling the beneficial uses of radiation and radioactive materials. In addition, emphasis is provided in nuclear instrumentation, nuclear systems and materials, radiation protection, reactor analysis and nuclear power economics and, particularly, safety and regulation in nuclear operations.

The Department of Nuclear Engineering and Radiation Health Physics aims to educate students majoring in radiation health physics to become radiation health physicists with the ability to achieve the highest standards of the profession and to support the needs of industry, government, and the nation.

The radiation health physics undergraduate program objectives are:

1. To produce graduates with a high level of competency in the radiation health physics core curriculum.
2. To produce graduates with a high level of competency in the biological and physical sciences.
3. To produce graduates who can work effectively in both individual and team environments.
4. To produce graduates with effective communication skills.
5. To produce graduates with a high regard for their profession and their responsibility to lifelong learning.

Radiation health physics is a specialized program in the Department of Nuclear Engineering and Radiation Health Physics for students with a professional interest in the field of radiation protection, also known as health physics. It involves an integrated study of the physical aspects of ionizing and nonionizing radiation, their biological effects, and the methods used to protect people and their environment from radiation hazards while still enabling the beneficial uses of radiation and radioactive material.

PRE-MED OPTION

Students in radiation health physics can also pursue a pre-med option in which they fulfill the requirements for the BS in Radiation Health Physics degree, as well as the course work expected for entrance into most medical schools.

CERTIFIED HEALTH PHYSICIST

Students completing the Radiation Health Physics degree will be eligible to take Part I of the Certified Health Physicist (CHP) Examination of the American Board of Health Physics after one year of applied health physics practice. After six years of responsible professional experience in health physics, graduates will be eligible to take Part II of the CHP examination.

UNDERGRADUATE MAJORS WITH OPTIONS**NUCLEAR ENGINEERING (BS, CRED, HBS)**

The objectives of the nuclear engineering and radiation health physics undergraduate curricula are to prepare students for careers related to the many beneficial uses of nuclear technology and energy. Nuclear engineers apply scientific principles to the research, design, and operation of a wide variety of nuclear technology applications including power generation, medicine, and radioactive waste management. Radiation health physicists study methods used to protect people and their environment from radiation hazards while enabling the beneficial uses of radiation and radioactive materials. In addition, emphasis is provided in nuclear instrumentation, nuclear systems and materials, radiation protection, reactor analysis and nuclear power economics and, particularly, safety and regulation in nuclear operations.

Pre-Nuclear Engineering**Freshman Year (46)**

CH 201. Chemistry for Engineering Majors (3)^E
 CH 202. Chemistry for Engineering Majors (3)
 COMM 111. *Public Speaking (3)^E
 or COMM 114. *Argument and Critical Discourse (3)^E
 HHS 231. *Lifetime Fitness for Health (2)
 HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)
 or any PAC course (1–2)
 MTH 251. *Differential Calculus (4)^E
 MTH 252. Integral Calculus (4)^E
 MTH 254. Vector Calculus I (4)^E
 NE 114. Introduction to Nuclear Engineering and Radiation Health Physics I (3)
 NE 115. Introduction to Nuclear Engineering and Radiation Health Physics II (3)^E
 PH 211. *General Physics with Calculus (4)^E
 WR 121. *English Composition (3)^E
 Free Elective (3)
 *Perspectives Courses (6)¹

Sophomore Year (47)

Biological Science Elective (4)¹
 ENGR 201. Electrical Fundamentals I (3)
 ENGR 211. Statics (3)^E
 ENGR 212. Dynamics (3)^E
 ENGR 213. Strength of Materials (3)
 ENGR 248. Engineering Graphics and 3-D Modeling (3)
 MTH 256. Applied Differential Equations (4)^E
 MTH 306. Matrix and Power Series Methods (4)^E
 NE 234, NE 235. Nuclear and Radiation Physics I, II (3,3)
 NE 236. Nuclear Radiation Detection and Instrumentation (4)
 PH 212, PH 213. *General Physics with Calculus (4,4)^E

Professional Nuclear Engineering**Junior Year (45)**

ENGR 321. Materials Science (4)
 ENGR 390. Engineering Economy (3)
 NE 311. Introduction to Thermal-Fluid Science (4)
 NE 312. Thermodynamics (4)
 NE 331. Introductory Fluid Mechanics (4)
 NE 332. Heat Transfer (4)
 NE 333. Mathematical Method for Nuclear Engineering and Radiation (3)
 NE 481. Radiation Protection (4)
 WR 327. *Technical Writing (3)¹
 Free Electives (2)
 *Perspectives Course (3)¹
 Restricted Elective (4)²
 *Synthesis Course (3)

Senior Year (42)

NE 407. Seminar in Nuclear Engineering (3 terms) (1,1,1)
 NE 415. Nuclear Rules and Regulations (2)³
 NE 435. Radiation Shielding and External Dosimetry (4)
 NE 451, NE 452. Neutronic Analysis and Lab I, II, (3,3)
 NE 457. Nuclear Reactor Laboratory (2)
 NE 467. Nuclear Reactor Thermal Hydraulics (4)
 NE 474. Nuclear Systems Design I (4)
 NE 475. ^Nuclear Systems Design II (4)
 *Perspectives Course (6)¹
 Restricted Elective (4)²
 *Synthesis Course (3)¹

Total =180**Footnotes:**

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)
^E Required for entry into the professional program.
¹ Must be selected to satisfy baccalaureate core requirements.
² Approved technical electives from departmental list.
³ Taught alternate years.

RADIATION HEALTH PHYSICS (BS, CRED, HBS)

Radiation health physics is a specialized program in the Department of Nuclear Engineering and Radiation Health Physics for students with a professional interest in the field of radiation protection, also known as health physics. It involves an integrated study of the physical aspects of ionizing and nonionizing radiation, their biological effects, and the methods used to protect people and their environment from radiation hazards while still enabling the beneficial uses of radiation and radioactive material.

Pre-Radiation Health Physics**Freshman Year (46)**

CH 121, CH 122, CH 123. *General Chemistry (5,5,5)^E
 or CH 231, CH 232, CH 233. *General Chemistry (4,4,4)^E
 and CH 261, CH 262, CH 263.
 *Laboratory for Chemistry 231, 232, 233 (1,1,1)^E
 COMM 111. *Public Speaking (3)^{1, E}

or COMM 114. *Argument and Critical Discourse (3)^{1, E}
 CS 101. Computers: Applications and Implications (4)
 or CS 151. Introduction to C Programming (4)
 MTH 251. *Differential Calculus (4)^E
 MTH 252. Integral Calculus (4)^E
 MTH 268. Mathematical Ideas in Biology (4)
 RHP 114. Introduction to Nuclear Engineering and Radiation Health Physics I (3)
 RHP 115. Introduction to Nuclear Engineering and Radiation Health Physics II (3)^E
 WR 121. *English Composition (3)^{1, E}
 *Perspectives Course (3)¹

Sophomore Year (45)

BI 211, BI 212. *Principles of Biology (4,4)^E
 BI 213. *Principles of Biology (4)
 HHS 231. *Lifetime Fitness for Health (2)¹
 HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)¹
 or any PAC course (1–2)
 PH 201, PH 202, PH 203. *General Physics (5,5,5)^E
 or PH 211, PH 212, PH 213. *General Physics with Calculus (4,4,4)^E
 plus free elective (3)
 RHP 234, RHP 235. Nuclear and Radiation Physics I, II (3,3)
 RHP 236. Nuclear Radiation Detection and Instrumentation (4)
 *Perspectives Course (3)¹

Professional**Radiation Health Physics****Junior Year (44)**

RHP 481. Radiation Protection (4)
 ST 201, ST 202. Principles of Statistics (4,4)
 or ST 314. Introduction to Statistics for Engineers (3)
 plus free elective (3)
 WR 327. *Technical Writing (3)
 Z 331. Human Anatomy and Physiology (3)
 Electives (restricted in Health) (3)
 Free Electives (3)
 *Perspectives Courses (9)¹
 Restricted Electives (10)³
 *Synthesis Course (3)¹

Senior Year (45)

H 425. Foundations of Epidemiology (3)
 RHP 407. Seminar in Radiation Health Physics (3 terms) (1,1,1)
 RHP 415. Nuclear Rules and Regulations (2)
 RHP 435. Radiation Shielding and External Dosimetry (4)
 RHP 475. ^Nuclear Systems Design II (4)
 RHP 483. Radioecology (4)
 RHP 488. Radioecology (3)
 Electives (restricted in Health) (9)
 Free Electives (8)
 Restricted Elective (3)²
 *Synthesis Course (3)¹

Total=180**Footnotes:**

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)
^E Required for entry into the professional program.
¹ Must be selected to satisfy the requirements of the baccalaureate core.

² Approved technical electives from departmental list.

OPTIONS

RADIATION HEALTH PHYSICS – PRE MED OPTION

Students in Radiation Health Physics can also pursue the Radiation Health Physics-Pre-Med option in which they fulfill the requirements for the BS degree in Radiation Health Physics, as well as the course work expected for entrance into most medical schools.

Freshman Year (47)

BI 109. Health Professions: Medical (1)
CH 231, CH 232, CH 233. *General Chemistry (4,4,4)^E
and CH 261, CH 262, CH 263.
*Laboratory for Chemistry 231, 232, 233 (1,1,1)^E

COMM 111. *Public Speaking (3)^E
or COMM 114. *Argument and Critical Discourse (3)^E

CS 101. Computers: Applications and Implications (4)
or CS 151. Introduction to C Programming (4)

MTH 251. *Differential Calculus (4)^E

MTH 252. Integral Calculus (4)^E

MTH 268. Mathematical Ideas in Biology (4)

RHP 114. Introduction to Nuclear Engineering and Radiation Health Physics I (3)

RHP 115. Introduction to Nuclear Engineering and Radiation Health Physics II (3)^E

WR 121. *English Composition (3)^E
Perspectives Course (3)¹

Sophomore Year (48)

BI 211. *Principles of Biology (4)^E

BI 212. *Principles of Biology (4)^E

BI 213. *Principles of Biology (4)

HHS 231. *Lifetime Fitness for Health (2)¹

HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)¹
or any PAC course (1–2)

PH 201, PH 202, PH 203. *General Physics (5,5,5)^E

or PH 211, PH 212, PH 213. *General Physics with Calculus (4,4,4)^E
plus free elective (3)

RHP 234, RHP 235. Nuclear and Radiation Physics I, II (3,3)

RHP 236. Nuclear Radiation Detection and Instrumentation (4)

Perspectives Courses (6)¹

Professional Radiation Health Physics-Pre Med Option

Junior Year (43)

BI 311. Genetics (4)

BI 314. Cell and Molecular Biology (3)

CH 334, CH 335, CH 336. Organic Chemistry (3,3,3)

H 425. Foundations of Epidemiology (3)

RHP 481. Radiation Protection (4)

ST 351. Introduction to Statistical Methods (4)

WR 327. *Technical Writing (3)

Z 331, Z 332, Z 333. Human Anatomy and Physiology (3,3,3)

Free Elective (1)

*Synthesis Course (3)¹

Senior Year (42)

BB 450, BB 451. General Biochemistry (4,3)

CH 337. Organic Chemistry Lab (4)

RHP 407. Seminar in Radiation Health Physics (3 terms) (1,1,1)

RHP 415. Nuclear Rules and Regulations (2)

RHP 435. Radiation Shielding and External Dosimetry (4)

RHP 475. [^]Nuclear Systems Design II (4)

RHP 483. Radiation Biology (4)

RHP 488. Radioecology (3)

Free Electives (2)

*Perspectives Course (6)¹

*Synthesis Course (3)¹

Total=180

Footnotes:

* Baccalaureate Core Course

[^] Writing Intensive Course (WIC)

^E Required for entry into the professional program.

¹ Must be selected to satisfy the requirements of the baccalaureate core.

² Approved technical electives from departmental list.

UNDERGRADUATE MINORS

NUCLEAR ENGINEERING MINOR

Students not majoring in nuclear engineering or radiation health physics may earn a Nuclear Engineering minor, which consists of the following courses:

NE 234, NE 235. Nuclear and Radiation Physics I, II (3,3)

NE 451. Neutronic Analysis and Lab I (4)

NE 481. Radiation Protection (4)

Other NE courses (200-level or higher) (12)

Total=28

RADIATION HEALTH PHYSICS MINOR

Students not majoring in radiation health physics or nuclear engineering may earn the Radiation Health Physics minor, which consists of the following courses:

RHP 234, RHP 235. Nuclear and Radiation Physics I, II (3,3)

RHP 236. Nuclear Radiation Detection and Instrumentation (4)

RHP 415. Nuclear Rules and Regulations (2)

RHP 435. Radiation Shielding and External Dosimetry (4)

RHP 475. [^]Nuclear Systems Design II (4)

RHP 481. Radiation Protection (4)

RHP 483. Radiation Biology (4)

Total=30

Footnote:

[^] Writing Intensive Course (WIC)

GRADUATE MAJORS

MEDICAL PHYSICS (MMP, MS, PhD)

Graduate Areas of Concentration *Medical health physics, therapeutic radiologic physics*

The programs consist of a minimum of 45 credits, 39 of which must be didactic. The following courses are required and the remaining credits can be compiled of any 500- or 600-level course taught in the department or from outside the department if approved by an advisor. A comprehensive oral exam must be passed to complete the degree. MS students, in addition to the exam, must present their work to a committee of graduate faculty.

For more information, please contact:

Dr. Krystina Tack, Director

100 Radiation Center

Oregon State University

Corvallis, OR 97331-5902

541-737-2343

541-737-0480 (fax)

krystina.tack@oregonstate.edu

NUCLEAR ENGINEERING (MEng, MS, PhD)

Graduate Areas of Concentration

Application of nuclear techniques, arms control technology, nuclear instrumentation and applications, nuclear medicine, nuclear power generation, nuclear reactor engineering, nuclear systems design and modeling, nuclear waste management, numerical methods for reactor analysis, radiation shielding, radioisotope production, space nuclear power, thermal hydraulics

The Department of Nuclear Engineering and Radiation Health Physics offers graduate work leading toward the Master of Engineering, Master of Science, and Doctor of Philosophy degrees in Nuclear Engineering, Master of Science, Master of Health Physics, and Doctor of Philosophy degrees in Radiation Health Physics, and Master of Medical Physics, Master of Science, and Doctor of Philosophy in Medical Physics.

The nuclear engineering and radiation health physics graduate degree programs are designed to prepare students for careers involved with the many beneficial applications of nuclear energy, radiation, and radioactive materials. The nuclear engineering and radiation health physics professions are essential to society's well-being since they enable significant public benefits through energy security, national defense, medical health, and industrial competitiveness.

In nuclear engineering particular attention is directed toward application of scientific principles to the safe design and operation of nuclear installations. In addition, emphasis is provided in system safety and thermal hydraulic testing, high performance computa-

tional methods development, nuclear instrumentation, nuclear systems and materials, radiation protection, reactor analysis, nuclear power economics, and the regulation of nuclear operations.

Competitive fellowships and research and teaching assistantships are available to incoming graduate students. The U.S. Department of Energy and National Academy for Nuclear Training support a number of fellowship programs each year. Oregon State University is one of eight participating universities in the U.S. where students may attend graduate school on the Nuclear Engineering, Health Physics, and Applied Health Physics fellowships sponsored by the U.S. Department of Energy. Each year the National Academy for Nuclear Training also supports fellowships for students entering nuclear engineering and radiation health physics at OSU. Research and teaching assistant opportunities are also available for students to support the educational and research programs conducted by the department.

World-class facilities are available for the instructional and research programs of the department. These are housed in the OSU Radiation Center and include a TRIGA Mark II nuclear reactor, the Advanced Thermal Hydraulic Research Laboratory, the APEX nuclear safety scaled testing facility, and laboratories specially designed to accommodate radiation and the use of radioactive materials.

For more information, visit the department's website at <http://ne.oregonstate.edu/>.

RADIATION HEALTH PHYSICS (MA, MHP, MS, PhD)

Graduate Areas of Concentration

Application of nuclear techniques, boron neutron capture therapy, emergency response planning, environmental monitoring, environmental pathways assessment, nuclear medicine, radiation detection and instrumentation, radiation dosimetry, radiation shielding, radioactive material transport, radioactive waste management, research reactor health physics, risk assessment

The Department of Nuclear Engineering and Radiation Health Physics offers graduate work leading toward the Master of Engineering, Master of Science, and Doctor of Philosophy degrees in Nuclear Engineering and Master of Health Physics (MHP), Master of Science, and Doctor of Philosophy degrees in Radiation Health Physics.

The nuclear engineering and radiation health physics graduate degree programs are designed to prepare students for careers involved with the many beneficial applications of nuclear energy, radiation, and radioactive materials. The nuclear engineering and radiation health physics professions are essential to society's

well-being since they enable significant public benefits through energy security, national defense, medical health, and industrial competitiveness.

The radiation health physics graduate curricula and research programs are designed for students with professional interests in the field of radiation protection. This specialized field involves an integrated study of the physical aspects of ionizing and nonionizing radiation, their biological effects, and the methods used to protect people and their environment from radiation hazards while still enabling the beneficial uses of radiation and radioactive materials.

Competitive fellowships and research and teaching assistantships are available to incoming graduate students. The U.S. Department of Energy and National Academy for Nuclear Training support a number of fellowship programs each year. Oregon State University is one of eight participating universities in the U.S. where students may attend graduate school on the Nuclear Engineering, Health Physics, and Applied Health Physics fellowships sponsored by the U.S. Department of Energy. Each year the National Academy for Nuclear Training also supports fellowships for students entering nuclear engineering and radiation health physics at OSU. Research and teaching assistant opportunities are also available for students to support the educational and research programs conducted by the department.

World-class facilities are available for the instructional and research programs of the department. These are housed in the OSU Radiation Center and include a TRIGA Mark II nuclear reactor, the Advanced Thermal Hydraulic Research Laboratory, the APEX nuclear safety scaled testing facility, and laboratories specially designed to accommodate radiation and the use of radioactive materials.

For more information, visit the department's website at <http://ne.oregonstate.edu/>.

NUCLEAR ENGINEERING GRADUATE MINOR

For more details, see the departmental advisor.

RADIATION HEALTH PHYSICS GRADUATE MINOR

For more details, see the departmental advisor.

■ MEDICAL PHYSICS COURSES

MP 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 99 credits.

MP 503. THESIS/DISSERTATION (1-16). This course is repeatable for a maximum of 999 credits.

MP 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

MP 506. SPECIAL PROBLEMS/SPECIAL PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

MP 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

MP 510. INTERNSHIP/WORK EXPERIENCE (1-16). This course is repeatable for a maximum of 16 credits.

MP 517. RADIONUCLIDES IN LIFE SCIENCES (4). Chemistry of actinides and fission products, radioseparations, selected medical generators, radiolabeling of organic molecules. Designed for majors in medical physics, radiation health physics, chemistry, pharmacy. CROSSLISTED as RHP 517. **PREREQS:** ((RHP 531 or NE 531) and RHP 536)

MP 531. RADIOPHYSICS (3). Expands students' understanding of concepts and applications of atomic and nuclear physics to enable their continued study in nuclear engineering and health physics. Includes fundamental concepts of nuclear and atomic physics, atomic and nuclear shell structure, radioactive decay, radiation interactions, radiation biology, and characteristics of fission. CROSSLISTED as NE 531 and RHP 531. **PREREQS:** Graduate standing.

MP 535. RADIATION SHIELDING AND EXTERNAL DOSIMETRY (4). Theoretical principles of shielding for neutron and gamma radiation; external dosimetry fundamentals for neutrons, photons, and charged particles; applications to problems of practical interest; analytical, numerical, and computer solutions emphasized. CROSSLISTED as NE 535, RHP 535. **PREREQS:** (NE 234 or RHP 234) and (NE 235 or RHP 235) and (NE 481 or RHP 481)

MP 536. ADVANCED RADIATION DETECTION AND MEASUREMENT (4). Principles and mechanisms underlying nuclear radiation detection and measurements; operation of nuclear electronic laboratory instrumentation; application of gas-filled, scintillation and semiconductor laboratory detectors for measurement of alpha, beta, gamma, and neutron radiation, liquid scintillation equipment; use of Bonner spheres for neutron energy profiles; experimental investigation of interactions of radiation with matter. Lec/lab. CROSSLISTED as NE 536, RHP 536. **PREREQS:** (MP 531 or NE 531 or RHP 531)

MP 541. DIAGNOSTIC IMAGING PHYSICS (3). An overview of the physics used in common diagnostic imaging approaches. Conceptually covers methodology and quality assurance of both ionizing and non-ionizing imaging techniques. Topics include X-rays and digital radiography, computed tomography, ultrasound, magnetic resonance imaging, and positron emission tomography. **PREREQS:** MP 535

MP 562. RADIATION THERAPY (3). The physics of radiation generation and delivery relevant to the field of clinical radiation oncology. Topics will include external beam radiation therapy; dosimetric calculations; high dose-rate and low dose-rate brachytherapy; electron beam dosimetry and treatment planning; photon beam dosimetry and treatment planning; special techniques in radiotherapy; and clinical radiation protection and quality assurance. **PREREQS:** (MP 531 or NE 531 or RHP 531) and graduate standing.

MP 563. APPLIED MEDICAL PHYSICS (4). The applied practice of therapeutic radiation physics for clinical radiation oncology. Topics will include current methodologies in treatment delivery and planning algorithms, best practices and protocols for quality assurance, special techniques in radiotherapy, and oncology. Lec/lab. **PREREQS:** MP 562 and/or instructor approval and graduate standing.

MP 582. APPLIED RADIATION SAFETY (4). Application of radiation protection as practiced in the fields of nuclear science and engineering; application of health physics principles to reduce the health hazards at each of the following stages:

design, prevention, assessment, and post-incident. A history of the key nuclear regulatory agencies; early and current radiation protection standards and organizations responsible for their formulation; major nuclear legislation; pertinent nuclear rules and regulations and their application. Lec/lab. CROSSLISTED as NE 582, RHP 582.

MP 583. RADIATION BIOLOGY (4). Biological effects of ionizing radiation at the molecular, cellular, and organismal levels with emphasis on vertebrates; both acute and chronic radiation effects are considered. CROSSLISTED as RHP 583. **PREREQS:** (NE 481 or RHP 481) and graduate standing.

MP 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

MP 601. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 99 credits.

MP 603. THESIS/DISSERTATION (1-16). This course is repeatable for a maximum of 999 credits.

MP 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

MP 606. SPECIAL PROBLEMS/SPECIAL PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

MP 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

MP 610. INTERNSHIP/WORK EXPERIENCE (1-16). This course is repeatable for a maximum of 16 credits.

■ NUCLEAR ENGINEERING COURSES

NE 114. INTRO TO NUCLEAR ENGINEERING AND RADIATION HEALTH PHYSICS (2). Introduction to the nuclear engineering and radiation health physics fields; problem-solving techniques; careers in the nuclear industry; engineering ethics; nuclear history; elementary nuclear and reactor physics; basic nuclear fission and fusion theory; reactor types; nuclear safety; nuclear fuel cycle; and radiation protection. CROSSLISTED as RHP 114.

NE 115. INTRO TO NUCLEAR ENGINEERING AND RADIATION HEALTH PHYSICS (2). Introduction to the nuclear engineering and radiation health physics fields; problem-solving techniques; careers in the nuclear industry; engineering ethics; nuclear history; elementary nuclear and reactor physics; basic nuclear fission and fusion theory; reactor types; nuclear safety; nuclear fuel cycle; and radiation protection. CROSSLISTED as RHP 115.

NE 116. INTRO TO NUCLEAR ENGINEERING AND RADIATION HEALTH PHYSICS (2). Introduction to the nuclear engineering and radiation health physics fields; problem-solving techniques; careers in the nuclear industry; engineering ethics; nuclear history; elementary nuclear and reactor physics; basic nuclear fission and fusion theory; reactor types; nuclear safety; nuclear fuel cycle; and radiation protection. CROSSLISTED as RHP 116.

NE 234. NUCLEAR AND RADIATION PHYSICS I (3). Relativistic dynamics; basic nuclear physics; basic quantum mechanics; radioactivity; electromagnetic waves; interaction of ionizing radiation with matter; cross sections; basic atomic structure. CROSSLISTED as RHP 234. **PREREQS:** MTH 251 or MTH 251H and MTH 252

NE 235. NUCLEAR AND RADIATION PHYSICS II (3). Radioactivity; radioactive decay modes; decay kinetics; interaction of neutrons with matter; nuclear reactions; fission and fusion basics; cross sections. CROSSLISTED as RHP 235. **PREREQS:** (NE 234 or RHP 234) and MTH 252

NE 236. NUCLEAR RADIATION DETECTION AND INSTRUMENTATION (4). Principles

and mechanisms underlying nuclear radiation detection and measurements; operation of nuclear electronic laboratory instrumentation; application of gas-filled, scintillation and semiconductor laboratory detectors for measurement of alpha, beta, gamma, and neutron radiation; experimental investigation of interactions of radiation with matter. Lec/lab. CROSSLISTED as RHP 236. **PREREQS:** (NE 235 or RHP 235)

NE 311. INTRODUCTION TO THERMAL-FLUID SCIENCES (4). Basic concepts of fluid mechanics, thermodynamics and heat transfer are introduced. Conservation of mass, energy, moment and the second law of thermodynamics are included. CROSSLISTED as ME 311. **PREREQS:** ((ENGR 212 or ENGR 212H) and (MTH 256 or MTH 256H))

NE 311H. INTRODUCTION TO THERMAL-FLUID SCIENCES (4). Basic concepts of fluid mechanics, thermodynamics and heat transfer are introduced. Conservation of mass, energy, moment and the second law of thermodynamics are included. CROSSLISTED as ME 311H. **PREREQS:** ((ENGR 212 or ENGR 212H) and (MTH 256 or MTH 256H)) and Honors College approval required.

NE 312. THERMODYNAMICS (4). Energy destruction, machine and cycle processes, law of corresponding states, non-reactive gas mixtures, reactive mixtures, thermodynamics of compressible fluid flow. CROSSLISTED as ME 312. **PREREQS:** (NE 311 or NE 311H or ME 311 or ME 311H) and (MTH 256 or MTH 256H)

NE 312H. THERMODYNAMICS (4). Energy destruction, machine and cycle processes, law of corresponding states, non-reactive gas mixtures, reactive mixtures, thermodynamics of compressible fluid flow. CROSSLISTED as ME 312H. **PREREQS:** (NE 311 or NE 311H or ME 311 or ME 311H) and (MTH 256 or MTH 256H) and Honors College approval required.

NE 319. *SOCIAL ASPECTS OF NUCLEAR TECHNOLOGY (3). Description and discussion of nuclear-related issues as they impact society. (Bacc Core Course)

NE 331. INTRODUCTORY FLUID MECHANICS (4). Introduces the concepts and applications of fluid mechanics and dimensional analysis with an emphasis on fluid behavior, internal and external flows, analysis of engineering applications of incompressible pipe systems, and external aerodynamics. CROSSLISTED as ME 331. **PREREQS:** ((MTH 254 or MTH 254H) and (MTH 256 or MTH 256H) and (ENGR 212 or ENGR 212H) and (ENGR 311 or ENGR 311H or ME 311 or ME 311H or NE 311 or NE 311H))

NE 331H. INTRODUCTORY FLUID MECHANICS (4). Introduces the concepts and applications of fluid mechanics and dimensional analysis with an emphasis on fluid behavior, internal and external flows, analysis of engineering applications of incompressible pipe systems, and external aerodynamics. CROSSLISTED as ME 331H. **PREREQS:** ((MTH 254 or MTH 254H) and (MTH 256 or MTH 256H) and (ENGR 212 or ENGR 212H) and (ENGR 311 or ENGR 311H or ME 311 or ME 311H or NE 311 or NE 311H)) and Honors College approval required.

NE 332. HEAT TRANSFER (4). A treatment of conductive, convective and radiative energy transfer using control volume and differential analysis and prediction of transport properties. CROSSLISTED as ME 332. **PREREQS:** ((MTH 256 or MTH 256H) and (ENGR 212 or ENGR 212H) and (NE 311 or NE 311H or ME 311 or ME 311H) and (ME 331 or ME 331H or NE 331 or NE 331H))

NE 332H. HEAT TRANSFER (4). A treatment of conductive, convective and radiative energy transfer using control volume and differential analysis and prediction of transport properties. CROSSLISTED as ME 332H. **PREREQS:** ((MTH 256 or MTH 256H) and (ENGR 212 or ENGR

212H) and (NE 311 or NE 311H or ME 311 or ME 311H) and (ME 331 or ME 331H or NE 331 or NE 331H)) and Honors College approval required.

NE 333. MATHEMATICAL METHOD FOR NUCLEAR ENGINEERING AND RADIATION (3). Development and application of analytical and numerical methods with applications to problems in the NE/RHP field. Major topics will include solution of ODEs and systems of ODEs, root finding techniques and numerical integration and differentiation. Major applications will include solution of the Bateman Equations and solution of the diffusion equation. CROSSLISTED as RHP 333. **PREREQS:** (MTH 256 or MTH 256H)

NE 401. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 99 credits.

NE 403. THESIS/DISSERTATION (1-16). This course is repeatable for a maximum of 16 credits.

NE 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

NE 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

NE 407. SEMINAR IN NUCLEAR ENGINEERING (1). Lectures on current topics in nuclear engineering. CROSSLISTED as RHP 407. Graded P/N. This course is repeatable for a maximum of 16 credits.

NE 410. INTERNSHIP (1-12). Supervised technical work experience at approved organizations. Graded P/N. This course is repeatable for a maximum of 12 credits. **PREREQS:** Upper-division standing.

NE 415. NUCLEAR RULES AND REGULATIONS (2). An introduction to the key nuclear regulatory agencies; major nuclear legislation; current radiation protection standards and organizations responsible for their implementation. Offered alternate years. CROSSLISTED as RHP 415/RHP 515. **PREREQS:** NE 481 or RHP 481.

NE 429. SELECTED TOPICS IN NUCLEAR ENGINEERING (1-3). Topics associated with nuclear engineering not covered in other undergraduate courses; topics may vary from year to year. This course is repeatable for a maximum of 45 credits. **PREREQS:** Instructor approval required.

NE 435. RADIATION SHIELDING AND EXTERNAL DOSIMETRY (4). Theoretical principles of shielding for neutron and gamma radiation; external dosimetry fundamentals for neutrons, photons, and charged particles; applications to problems of practical interest; analytical, numerical, and computer solutions emphasized. CROSSLISTED as RHP 435. **PREREQS:** ((NE 234 or RHP 234) and (NE 235 or RHP 235) and (NE 481 or RHP 481)) and/or instructor approval.

NE 440. NUCLEAR FUEL CYCLE AND WASTE MANAGEMENT (4). Mining, milling, conversion, enrichment, fuel fabrication, reprocessing, and waste management of nuclear fuel, including disposal of low- and high-level radioactive waste. **PREREQS:** (NE 235 or RHP 235)

NE 451. NEUTRONIC ANALYSIS I (3). Physical models of neutronic systems; nuclear physics; steady state and transient neutronic system behavior; introductory neutron transport theory, one speed diffusion theory; numerical methods; fast and thermal spectrum calculations; multigroup methods; transmutation and burnup; reactor fuel management; reactivity control; perturbation theory; neutronic laboratory sessions. **PREREQS:** ((MTH 256 or MTH 256H) and NE 235 and NE 333) and NE 451 and NE 452 must be taken in order.

NE 452. NEUTRONIC ANALYSIS II (3). Physical models of neutronic systems; nuclear physics; steady state and transient neutronic system behavior; introductory neutron transport theory, one speed diffusion theory; numerical methods;

fast and thermal spectrum calculations; multigroup methods; transmutation and burnup; reactor fuel management; reactivity control; perturbation theory; neutronic laboratory sessions. Lec/lab. **PREREQS:** ((MTH 256 or MTH 256H) and NE 235 and (MTH 351* or ME 373*) and NE 451) and (NE 451, NE 452 must be taken in order.)

NE 455. REACTOR OPERATOR TRAINING I (3). The Oregon State University TRIGA Reactor Operator Training I class is one of a two-course series. Students interested in participating in this course are expected to enroll in both the NE 455/555 and NE 456/556 classes taught during spring and summer terms. Students successfully completing the NE 455/555 and NE 456/556 series will culminate their course work with the opportunity to take a certification test proctored by the Nuclear Regulatory Commission. **PREREQS:** ((NE 236 or RHP 236) and (MTH 256 or MTH 256H))

NE 456. REACTOR OPERATOR TRAINING II (4). The Oregon State University TRIGA Reactor Operator Training class is one of a two-course series. Students interested in participating in this course must have already taken and successfully passed NE 455/NE 555. Students successfully completing NE 456/NE 556 will culminate their course work with the opportunity to take a certification test proctored by the Nuclear Regulatory Commission. **PREREQS:** NE 455 and Instructor approval required.

NE 457. NUCLEAR REACTOR LABORATORY (2). Experimental investigation of the principles of nuclear reactor operation. Use of the OSU TRIGA Reactor and other laboratory facilities. Preparation and presentation of laboratory reports. Lec/lab. **PREREQS:** ((NE 451 or NE 551) and (NE 452 or NE 552))

NE 467. NUCLEAR REACTOR THERMAL HYDRAULICS (4). Hydrodynamics and conductive, convective and radiative heat transfer in nuclear reactor systems. Core heat removal design; critical heat flux, hot spot factors, single- and two-phase flow behavior. Advanced thermal hydraulic computer codes. **PREREQS:** (ME 332 or NE 332)

NE 468. NUCLEAR REACTOR SAFETY (3). Focused on probability risk assessment and system reliability analysis techniques applied to nuclear reactor safety. Application of these methods will be performed specifically through examination of neutronics and thermal hydraulic transients, effectiveness of emergency systems, accident prevention and mitigation, and assessment of radioactive release to the environment. **PREREQS:** ((NE 451 or NE 551) and (NE 467 or NE 567))

NE 474. NUCLEAR SYSTEMS DESIGN I (4). Practical design of nuclear power systems using fundamental nuclear engineering skills. Design projects involve the integration of reactor neutronics, dynamics and control, thermal hydraulics, transient analysis, safety analysis, power production, nuclear materials, fuel management and economic optimization. Emphasis is placed on designing advanced reactor systems for power production purposes. State-of-the-art computer codes are used for design analysis and evaluation. **PREREQS:** ((NE 332 or ME 332) and NE 451 and NE 467) and NE 474 and NE 475 must be taken in order.

NE 475. ^NUCLEAR SYSTEMS DESIGN II (4). Practical design of nuclear power systems using fundamental nuclear engineering skills. Design projects involve the integration of reactor neutronics, dynamics and control, thermal hydraulics, transient analysis, safety analysis, power production, nuclear materials, fuel management and economic optimization. Emphasis is placed on designing advanced reactor systems for power production purposes. State-of-the-art computer codes are used for design analysis and evaluation. (Writing Intensive Course) **CROSSLISTED** as RHP 475/RHP 575.

PREREQS: (NE 474 and NE 452*) and senior standing. NE 474 and NE 475 must be taken in order.

NE 481. RADIATION PROTECTION (4). Fundamental principles and theory of radiation protection; regulatory agencies; dose units; source of radiation; biological effects and risk; dose limits; applications of external and internal dosimetry; shielding and atmospheric dispersion. **CROSSLISTED** as RHP 481. **PREREQS:** (NE 235 or RHP 235)

NE 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

NE 501. RESEARCH (1-16). This course is repeatable for a maximum of 99 credits.

NE 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

NE 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

NE 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

NE 507. SEMINAR IN NUCLEAR ENGINEERING (1). Lectures on current nuclear engineering topics. **CROSSLISTED** as RHP 507. Graded P/N. This course is repeatable for a maximum of 16 credits.

NE 510. INTERNSHIP (1-12). Supervised technical work experience at approved organizations. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Graduate standing.

NE 515. NUCLEAR RULES AND REGULATIONS (2). An introduction to the key nuclear regulatory agencies; major nuclear legislation; current radiation protection standards and organizations responsible for their implementation. Offered alternate years. **CROSSLISTED** as RHP 415/RHP 515. **PREREQS:** NE 481 or RHP 481

NE 516. RADIOCHEMISTRY (4). Selected methods in radiochemical analysis. Actinide chemistry, activation analysis, radionuclide solvent extraction, and microbial reactions with radionuclides. Designed for majors in chemistry, chemical engineering, nuclear engineering, and radiation health physics. Lec/lab. **CROSSLISTED** as CH 516 and RHP 516. **PREREQS:** ((NE 531 or RHP 531) and RHP 536) and/or instructor approval.

NE 526. NUMERICAL METHODS FOR ENGINEERING ANALYSIS (3). Numerical solutions of linear equations, difference equations, ordinary and partial differential equations. **CROSSLISTED** as ME 526. **PREREQS:** Programming experience and previous exposure to numerical methods, or instructor approval.

NE 531. RADIOPHYSICS (3). Expands understanding of concepts and applications of atomic and nuclear physics to enable continued study in nuclear engineering and health physics. Includes fundamental concepts of nuclear and atomic physics, atomic and nuclear shell structure, radioactive decay, radiation interactions, radiation biology, and the characteristics of fission. **CROSSLISTED** as RHP 531 and MP 531. **PREREQS:** Graduate standing.

NE 535. RADIATION SHIELDING AND EXTERNAL DOSIMETRY (4). Theoretical principles of shielding for neutron and gamma radiation; external dosimetry fundamentals for neutrons, photons, and charged particles; applications to problems of practical interest; analytical, numerical, and computer solutions emphasized. **CROSSLISTED** as MP 535, RHP 535. **PREREQS:** (NE 234 or RHP 234) and (NE 235 or RHP 235) and (NE 481 or RHP 481)

NE 536. ADVANCED RADIATION DETECTION AND MEASUREMENT (4). Principles and mechanisms underlying nuclear radiation detection and measurements; operation of nuclear

electronic laboratory instrumentation; application of gas-filled, scintillation and semiconductor laboratory detectors for measurement of alpha, beta, gamma, and neutron radiation, liquid scintillation equipment; use of Bonner spheres for neutron energy profiles; experimental investigation of interactions of radiation with matter. Lec/lab. **CROSSLISTED** as MP 536, RHP 536. **PREREQS:** (NE 531 or RHP 531 or MP 531)

NE 537. DIGITAL RADIATION MEASUREMENT AND SPECTROSCOPY (3). Principles of digital spectroscopy; application of digital filters in digital processing of detector pulses; hardware implementation of a typical digital spectrometer; introduction of Field-Programmable Gate Array (FPGA) devices programming a digital spectrometer using Hardware Description Language (VHDL); simulation, synthesis and spectroscopy; experimental design tests and evaluation. Lec/lab. **CROSSLISTED** as RHP 537. **PREREQS:** (NE 536 or RHP 536)

NE 539. SELECTED TOPICS IN INTERACTION OF NUCLEAR RADIATION (1-6). Topics associated with interactions of nuclear radiation not covered in other graduate courses; topics may vary from year to year. **CROSSLISTED** as RHP 539. This course is repeatable for a maximum of 45 credits. **PREREQS:** Instructor approval required.

NE 540. NUCLEAR FUEL CYCLE AND WASTE MANAGEMENT (4). Mining, milling, conversion, enrichment, fuel fabrication, reprocessing, and waste management of nuclear fuel, including disposal of low- and high-level radioactive waste.

NE 549. SELECTED TOPICS IN NUCLEAR FUEL CYCLE ANALYSIS (1-6). Topics associated with the nuclear fuel cycle not covered in other graduate courses; topics may vary from year to year. This course is repeatable for a maximum of 45 credits.

NE 551. NEUTRONIC ANALYSIS I (3). Physical models of neutronic systems; nuclear physics; steady state and transient neutronic system behavior; introductory neutron transport theory, one speed diffusion theory; numerical methods; fast and thermal spectrum calculations; multigroup methods; transmutation and burnup; reactor fuel management; reactivity control; perturbation theory; neutronic laboratory sessions. **PREREQS:** ((MTH 256 or MTH 256H) and NE 235 and NE 333). NE 551 and NE 552 must be taken in order.

NE 552. NEUTRONIC ANALYSIS II (3). Physical models of neutronic systems; nuclear physics; steady state and transient neutronic system behavior; introductory neutron transport theory, one speed diffusion theory; numerical methods; fast and thermal spectrum calculations; multigroup methods; transmutation and burnup; reactor fuel management; reactivity control; perturbation theory; neutronic laboratory sessions. Lec/lab. **PREREQS:** NE 551 and (MTH 256 or MTH 256H) and NE 235 and (MTH 351 or ME 373). NE 551 and NE 552 must be taken in order.

NE 553. ADVANCED NUCLEAR REACTOR PHYSICS (3). Advanced analytic and numerical techniques for the prediction of the neutron population in nuclear reactor systems. Topics will include long characteristic neutron transport, collision probabilities, nodal methods, equivalence theory, and perturbation theory. **PREREQS:** (NE 551 and NE 552) and computer programming experience or instructor approval.

NE 555. REACTOR OPERATOR TRAINING I (3). The Oregon State University TRIGA Reactor Operator Training I class is one of a two-course series. Students interested in participating in this course are expected to enroll in both the NE 455/555 and NE 456/556 classes taught during spring and summer terms. Students successfully completing the NE 455/555 and NE 456/556 series will culminate their course work with the opportunity to take a certification test proctored by the Nuclear Regulatory Commission. **PREREQS:** (NE 236 or RHP 236) and (MTH 256 or MTH

256H)

NE 556. REACTOR OPERATOR TRAINING II (4). The Oregon State University TRIGA Reactor Operator Training II class is one of a two-course series. Students interested in participating in this course must have already taken and successfully passed NE 455/NE 555. Students successfully completing NE 456/NE 556 will culminate their course work with the opportunity to take a certification test proctored by the Nuclear Regulatory Commission. **PREREQS:** NE 555 and instructor approval required.

NE 557. NUCLEAR REACTOR LABORATORY (2). Experimental investigation of the principles of nuclear reactor operation. Use of the OSU TRIGA Reactor and other laboratory facilities. Preparation and presentation of laboratory reports. Lec/lab. **PREREQS:** (NE 551 and NE 552)

NE 559. SELECTED TOPICS IN NUCLEAR REACTOR ANALYSIS (1-3). Topics associated with nuclear reactor theory not covered in other graduate courses; topics may vary from year to year. This course is repeatable for a maximum of 45 credits. **PREREQS:** NE 553

NE 561. NUCLEAR REACTOR SYSTEMS LABORATORY (3). Operational aspects of nuclear reactor systems; neutronic and thermal-hydraulic characterization of nuclear reactors; examination of design basis accident prevention and mitigation; loss of coolant accidents; loss of flow accidents; station blackouts. Lec/lab. **PREREQS:** (NE 553 and NE 567)

NE 565. APPLIED THERMAL HYDRAULICS (3). Advanced topics in the computational modeling of the hydrodynamic and heat transfer phenomena of nuclear reactors. Steady-state and transient solutions of one-dimensional nuclear reactor thermal hydraulic models. Nuclear reactor behavior analysis during various accident scenarios. **PREREQS:** CS 151 and ME 373 and NE 467

NE 567. NUCLEAR REACTOR THERMAL HYDRAULICS (4). Hydrodynamics and convective, convective and radiative heat transfer in nuclear reactor systems. Core heat removal design; critical heat flux, hot spot factors, single- and two-phase flow behavior. Advanced thermal hydraulic computer codes. **PREREQS:** ME 332 or NE 332.

NE 568. NUCLEAR REACTOR SAFETY (3). Focused on probability risk assessment and system reliability analysis techniques applied to nuclear reactor safety. Application of these methods will be performed specifically through examination of neutronics and thermal hydraulic transients, effectiveness of emergency systems, accident prevention and mitigation, and assessment of radioactive release to the environment. **PREREQS:** (NE 451 or NE 551) and (NE 467 or NE 567)

NE 569. SELECTED TOPICS IN NUCLEAR REACTOR ENGINEERING (1-6). Advanced nuclear engineering design concepts, reactor systems analysis techniques and innovative nuclear engineering applications. Artificial intelligence and expert system applications to nuclear engineering problems. Topics may vary from year to year. This course is repeatable for a maximum of 30 credits.

NE 574. NUCLEAR SYSTEMS DESIGN I (4). Practical design of nuclear power systems using fundamental nuclear engineering skills. Design projects involve the integration of reactor neutronics, dynamics and control, thermal hydraulics, transient analysis, safety analysis, power production, nuclear materials, fuel management and economic optimization. Emphasis is placed on designing advanced reactor systems for power production purposes. State-of-the-art computer codes are used for design analysis and evaluation. **PREREQS:** (NE 551 and NE 567) and (NE 332 or ME 332). NE 574 and NE 575 must be taken in order.

NE 575. NUCLEAR SYSTEMS DESIGN II (4). Practical design of nuclear power systems using fundamental nuclear engineering skills. Design projects involve the integration of reactor neutronics, dynamics and control, thermal hydraulics, transient analysis, safety analysis, power production, nuclear materials, fuel management and economic optimization. Emphasis is placed on designing advanced reactor systems for power production purposes. State-of-the-art computer codes are used for design analysis and evaluation. **CROSSLISTED** as RHP 475/RHP 575. **PREREQS:** (NE 552 and NE 574) and (NE 574 and NE 575 must be taken in order.)

NE 582. APPLIED RADIATION SAFETY (4). Application of radiation protection as practiced in the fields of nuclear science and engineering; application of health physics principles to reduce health hazards at each of the following stages: design, prevention, assessment, and post-incident. A history of key nuclear regulatory agencies; early and current radiation protection standards and organizations responsible for their formulation; major nuclear legislation; pertinent nuclear rules and regulations and their application. Lec/lab. **CROSSLISTED** as MP 582, RHP 582.

NE 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

NE 601. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 99 credits.

NE 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

NE 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

NE 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

NE 607. SEMINAR IN NUCLEAR ENGINEERING (1). Lectures on current nuclear engineering topics. **CROSSLISTED** as RHP 607. Graded P/N. This course is repeatable for a maximum of 16 credits.

NE 654. COMPUTATIONAL PARTICLE TRANSPORT (3). Properties of and methods for solution of the linear Boltzmann equation for nuclear reactors; spherical and double-spherical harmonics; integral equation methods; Monte Carlo methods. **PREREQS:** (NE 551 and NE 552)

NE 667. ADVANCED THERMAL HYDRAULICS (3). Advanced topics in single- and two-phase hydrodynamics and heat transfer for nuclear reactors. Two-phase flow patterns, flow instabilities, condensation induced transients, convective boiling heat transfer, and current topics in reactor safety thermal hydraulics. Offered alternate years. **PREREQS:** NE 567

NE 699. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

NE 808. WORKSHOP (1-4). This course is repeatable for a maximum of 16 credits.

■ RADIATION HEALTH PHYSICS COURSES

RHP 114. INTRO TO NUCLEAR ENGINEERING AND RADIATION HEALTH PHYSICS (2). Introduction to the nuclear engineering and radiation health physics fields; problem-solving techniques; careers in the nuclear industry; engineering ethics; nuclear history; elementary nuclear and reactor physics; basic nuclear fission and fusion theory; reactor types; nuclear safety; nuclear fuel cycle; and radiation protection. **CROSSLISTED** as NE 114.

RHP 115. INTRO TO NUCLEAR ENGINEERING AND RADIATION HEALTH PHYSICS (2). Introduction to the nuclear engineering and radiation health physics fields; problem-solving techniques; careers in the nuclear industry; engineering ethics; nuclear history; elementary

nuclear and reactor physics; basic nuclear fission and fusion theory; reactor types; nuclear safety; nuclear fuel cycle; and radiation protection. **CROSSLISTED** as NE 115.

RHP 116. INTRO TO NUCLEAR ENGINEERING AND RADIATION HEALTH PHYSICS (2). Introduction to the nuclear engineering and radiation health physics fields; problem-solving techniques; careers in the nuclear industry; engineering ethics; nuclear history; elementary nuclear and reactor physics; basic nuclear fission and fusion theory; reactor types; nuclear safety; nuclear fuel cycle; and radiation protection. **CROSSLISTED** as NE 116.

RHP 234. NUCLEAR AND RADIATION PHYSICS I (3). Relativistic dynamics; basic nuclear physics; basic quantum mechanics; radioactivity; electromagnetic waves; interaction of ionizing radiation with matter; cross sections; basic atomic structure. **CROSSLISTED** as NE 234. **PREREQS:** MTH 234 or MTH 234H and MTH 252

RHP 235. NUCLEAR AND RADIATION PHYSICS II (3). Radioactivity; radioactive decay modes; decay kinetics, interaction of neutrons with matter; nuclear reactions; fission and fusion basics; cross sections. **CROSSLISTED** as NE 235. **PREREQS:** (NE 234 or RHP 234) and MTH 252

RHP 236. NUCLEAR RADIATION DETECTION AND INSTRUMENTATION (4). Principles and mechanisms underlying nuclear radiation detection and measurements; operation of nuclear electronic laboratory instrumentation; application of gas-filled, scintillation and semiconductor laboratory detectors for measurement of alpha, beta, gamma, and neutron radiation; experimental investigation of interactions of radiation with matter. Lec/lab. **CROSSLISTED** as NE 236. **PREREQS:** (NE 235 or RHP 235)

RHP 333. MATHEMATICAL METHOD FOR NUCLEAR ENGINEERING AND RADIATION (3). Development and application of analytical and numerical methods with applications to problems in the NE/RHP field. Major topics will include solution of ODEs and systems of ODEs, root finding techniques and numerical integration and differentiation. Major applications will include solution of the Bateman Equations and solution of the diffusion equation. **CROSSLISTED** as NE 333. **PREREQS:** MTH 256 or MTH 256H

RHP 401. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 99 credits.

RHP 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

RHP 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

RHP 407. SEMINAR IN RADIATION HEALTH PHYSICS (1). Lectures on current topics in radiation health physics. **CROSSLISTED** as NE 407. Graded P/N. This course is repeatable for a maximum of 16 credits.

RHP 410. INTERNSHIP (1-12). Supervised technical work experience at approved organizations. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Upper-division standing.

RHP 415. NUCLEAR RULES AND REGULATIONS (2). An introduction to the key nuclear regulatory agencies; major nuclear legislation; current radiation protection standards and organizations responsible for their implementation. Offered alternate years. **CROSSLISTED** as NE 415/NE 515. **PREREQS:** NE 481 or RHP 481

RHP 435. RADIATION SHIELDING AND EXTERNAL DOSIMETRY (4). Theoretical principles of shielding for neutron and gamma radiation; external dosimetry fundamentals for neutrons, photons, and charged particles; applications to problems of practical interest; analytical, numerical, and computer solutions emphasized. **CROSSLISTED** as NE 435.

PREREQS: ((NE 234 or RHP 234) and (NE 235 or RHP 235) and (NE 481 or RHP 481)) and /or instructor approval.

RHP 450. PRINCIPLES OF NUCLEAR MEDICINE (3). Basic principles of nuclear medicine; detectors; radiopharmaceutical; dosimetry; imaging procedures.

RHP 475. *NUCLEAR SYSTEMS DESIGN II (4). Part II of a two-part series aimed at developing the student-s ability to transform concepts into practical designs. Students will work with fundamental principles in the areas of statics, materials, dynamics, fluids, heat transfer, radiation, economics and neutronics to create new engineering designs and to solve practical design problems. Students will apply calculational methods and advanced computer codes for design analysis and evaluation. The course will require both individual and group design projects. Each student will be required to develop a design reference notebook that will be used and updated throughout the term. Each student will be involved in writing clear and concise technical memoranda and design reports on a regular basis. Oral presentations will also be required. (Writing Intensive Course) **CROSSLISTED** as NE 475/NE 575. **PREREQS:** Senior standing.

RHP 481. RADIATION PROTECTION (4). Fundamental principles and theory of radiation protection; regulatory agencies, dose units, sources of radiation, biological effects and risk, dose limits, applications of external and internal dosimetry, shielding and atmospheric dispersion. **CROSSLISTED** as NE 481. **PREREQS:** (RHP 235 or NE 235)

RHP 483. RADIATION BIOLOGY (4). Biological effects of ionizing radiation at the molecular, cellular, and organismal levels with emphasis on vertebrates; both acute and chronic radiation effects are considered. **PREREQS:** (RHP 481* or NE 481*) and /or senior standing.

RHP 488. RADIOECOLOGY (3). Radionuclides in the environment; their measurement and identification, uptake and transfer through food chains. Effect of radiation on natural populations of plants and animals. **PREREQS:** Senior standing.

RHP 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

RHP 501. RESEARCH (1-16). This course is repeatable for a maximum of 99 credits.

RHP 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

RHP 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

RHP 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

RHP 507. SEMINAR IN RADIATION HEALTH PHYSICS (1). Lectures on current topics in radiation health physics. **CROSSLISTED** as NE 507. Graded P/N. This course is repeatable for a maximum of 16 credits.

RHP 510. INTERNSHIP (1-12). Supervised technical work experience at approved organizations. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Graduate standing.

RHP 515. NUCLEAR RULES AND REGULATIONS (2). An introduction to the key nuclear regulatory agencies; major nuclear legislation; current radiation protection standards and organizations responsible for their implementation. Offered alternate years. **CROSSLISTED** as NE 415/NE 515. **PREREQS:** NE 481 or RHP 481

RHP 516. RADIOCHEMISTRY (4). Selected methods in radiochemical analysis. Actinide chemistry, activation analysis, radionuclide solvent extraction, and microbial reactions with radionuclides. Designed for majors in chemistry,

chemical engineering, nuclear engineering and radiation, health physics. Lec/lab. **CROSSLISTED** as CH 516 and NE 516. **PREREQS:** ((NE 531 or RHP 531) and RHP 536) and /or instructor approval required.

RHP 517. RADIONUCLIDES IN LIFE SCIENCES (4). Chemistry of actinides and fission products, radioseparations, selected medical generators, radiolabeling of organic molecules. Designed for majors in medical physics, radiation health physics, chemistry, pharmacy. **CROSSLISTED** as MP 517. **PREREQS:** ((RHP 531 or NE 531) and RHP 536)

RHP 531. RADIOPHYSICS (3). Expands students' understanding of concepts and applications of atomic and nuclear physics to enable their continued study in nuclear engineering and health physics. Includes fundamental concepts of nuclear and atomic physics, atomic and nuclear shell structure, radioactive decay, radiation interactions, radiation biology, and characteristics of fission. **CROSSLISTED** as NE 531 and MP 531. **PREREQS:** Graduate standing.

RHP 535. RADIATION SHIELDING AND EXTERNAL DOSIMETRY (4). Theoretical principles of shielding for neutron and gamma radiation; external dosimetry fundamentals for neutrons, photons, and charged particles; applications to problems of practical interest; analytical, numerical, and computer solutions emphasized. **CROSSLISTED** as MP 535, NE 535. **PREREQS:** (NE 234 or RHP 234) and (NE 235 or RHP 235) and (NE 481 or RHP 481)

RHP 536. ADVANCED RADIATION DETECTION AND MEASUREMENT (4). Principles and mechanisms underlying nuclear radiation detection and measurements; operation of nuclear electronic laboratory instrumentation; application of gas-filled, scintillation and semiconductor laboratory detectors for measurement of alpha, beta, gamma, and neutron radiation, liquid scintillation equipment; use of Bonner spheres for neutron energy profiles; experimental investigation of interactions of radiation with matter. Lec/lab. **CROSSLISTED** as NE 536, MP 536. **PREREQS:** (NE 531 or RHP 531 or MP 531)

RHP 537. DIGITAL RADIATION MEASUREMENT AND SPECTROSCOPY (3). Principles of digital spectroscopy; application of digital filters in digital processing of detector pulses; hardware implementation of a typical digital spectrometer; introduction of Field-Programmable Gate Array (FPGA) devices programming a digital spectrometer using Hardware Description Language (VHDL); simulation, synthesis and spectroscopy; experimental design tests and evaluation. Lec/lab. **CROSSLISTED** as NE 537. **PREREQS:** (RHP 536 or NE 536)

RHP 539. SELECTED TOPICS IN INTERACTION OF NUCLEAR RADIATION (1-6). Topics associated with interactions of nuclear radiation not covered in other graduate courses; topics may vary from year to year. **CROSSLISTED** as NE 539. This course is repeatable for a maximum of 45 credits. **PREREQS:** Instructor approval required.

RHP 550. PRINCIPLES OF NUCLEAR MEDICINE (3). Basic principles of nuclear medicine; detectors; radiopharmaceutical; dosimetry; imaging procedures.

RHP 575. NUCLEAR SYSTEMS DESIGN II (4). Part II of a two-part series aimed at developing the student-s ability to transform concepts into practical designs. Students will work with fundamental principles in the areas of statics, materials, dynamics, fluids, heat transfer, radiation, economics and neutronics to create new engineering designs and to solve practical design problems. Students will apply calculational methods and advanced computer codes for design analysis and evaluation. The course will require both individual and group design projects. Each student will be required to develop a design reference notebook that will be used and updated throughout the term. Each student will

be involved in writing clear and concise technical memoranda and design reports on a regular basis. Oral presentations will also be required. **CROSSLISTED** as NE 475/NE 575.

RHP 582. APPLIED RADIATION SAFETY (4). Application of radiation protection as practiced in the fields of nuclear science and engineering; application of health physics principles to reduce the health hazards at each of the following stages: design, prevention, assessment, and post-incident. A history of the key nuclear regulatory agencies; early and current radiation protection standards and organizations responsible for their formulation; major nuclear legislation; pertinent nuclear rules and regulations and their application. Lec/lab. **CROSSLISTED** as MP 582, NE 582. **PREREQS:** .

RHP 583. RADIATION BIOLOGY (4). Biological effects of ionizing radiation at the molecular, cellular, and organismal levels with emphasis on vertebrates; both acute and chronic radiation effects are considered. **CROSSLISTED** as MP 583. **PREREQS:** (NE 481 or RHP 481) and graduate standing.

RHP 588. RADIOECOLOGY (3). Radionuclides in the environment; their measurement and identification, uptake and transfer through food chains. Effect of radiation on natural populations of plants and animals. **PREREQS:** RHP 381 or NE 381 or graduate standing.

RHP 590. INTERNAL DOSIMETRY (3). Further development and more in-depth treatment of internal dosimetry concepts introduced in NE/RHP 582, including the theoretical basis of energy deposition, biokinetics, and estimation of radiation risk from ingested, inhaled, or injected radionuclides. **PREREQS:** ((NE 531 or RHP 531) and (NE 535 or RHP 535)) and /or equivalent or instructor approval.

RHP 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

RHP 601. RESEARCH (1-16). This course is repeatable for a maximum of 99 credits.

RHP 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

RHP 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

RHP 606. PROJECT (1-16). This course is repeatable for a maximum of 16 credits.

RHP 607. SEMINAR IN RADIATION HEALTH PHYSICS (1). Lectures on current topics in radiation health physics. **CROSSLISTED** as NE 607. Graded P/N. This course is repeatable for a maximum of 16 credits.

RHP 610. INTERNSHIP (1-12). Graded P/N. This course is repeatable for a maximum of 16 credits.

RHP 699. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

SCHOOL OF CHEMICAL, BIOLOGICAL AND ENVIRONMENTAL ENGINEERING

Gregory L. Rorrer, Head

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FACULTY

Professors Chang, Jovanovic, Koretsky, McGuire¹, Rorrer, Semprini¹, Wood

Associate Professors Bothwell, Dolan, Herman, Kelly, Levien¹, Nason, Rochefort, Wildenschild, Yokochi

Assistant Professors Arnadottir, Baid, Harper, Higgins, Montfort, Radiecki, Schilke, Walker

Instructor Huber

***Linus Pauling Engineer** Harding¹

¹Licensed professional engineer

Undergraduate Majors

Bioengineering (BA, BS, CRED, HBA, HBS)

**Chemical Engineering
(BA, BS, CRED, HBA, HBS)**

Options

Biochemical Processes

Environmental Processes

Microelectronics Processes and Material Sciences

Nanotechnology Processes

Environmental Engineering

(BA, BS, CRED, HBA, HBS)

Minor

Environmental Engineering

Graduate Majors

Chemical Engineering (MEng, MS, PhD)

Graduate Areas of Concentration

Chemical Engineering

Environmental Engineering

(MENG, MS, PhD, MAIS)

Graduate Areas of Concentration

Bioremediation

Environmental Fluid Mechanics

Environmental Microbiology

Environmental Modeling

Multiphase Phenomena

Subsurface Flow and Transport

Water and Wastewater Treatment

Graduate Minors

Chemical Engineering

Environmental Engineering

The School of Chemical, Biological, and Environmental Engineering (CBEE) offers three undergraduate programs: Chemical Engineering (CHE), Bioengineering

(BIOE), and Environmental Engineering (ENVE). The Bachelor of Science degrees in CHE, BIOE, and ENVE are each separately accredited by ABET, the Accreditation Board for Engineering and Technology. The Bachelor of Art degrees in CHE, BIOE, and ENVE are not accredited by ABET.

The goals of the CBEE undergraduate program are consistent with the mission and goals of the College of Engineering, and focus on creating work- and leadership-ready graduates who will be successful in professional careers as a chemical engineer, bioengineer, or environmental engineer in the private or public sectors, including industry, government, and consulting, as well as for continued graduate study in the same or closely related fields.

Chemical engineering (CHE) is the engineering discipline that focuses on the science and engineering of processes to convert raw materials into valued chemicals and products on a manufacturing scale.

Bioengineering (BIOE) is an interdisciplinary field that applies scientific and engineering principles to the development of new biologics, materials, devices, and processes in the broad areas of bioprocess, biomedical, and bioenvironmental technology.

Environmental engineering (ENVE) is the engineering discipline that applies scientific and engineering principles to improve the natural environment, to provide healthy water, air, and land, and to remediate polluted sites.

The educational objectives and curriculum are described separately for each CHE, BIOE, and ENVE program. The school has a core undergraduate curriculum where CHE, BIOE, and ENVE students take common courses in first through senior years, including first-year engineering, process material and energy balances, thermodynamics and transport phenomena, and senior year laboratory.

The school also offers one graduate program in chemical engineering leading to MEng, MS, and PhD degrees.

UNDERGRADUATE MAJORS WITH OPTIONS

BIOENGINEERING (BA, BS, CRED, HBA, HBS)

The School of Chemical, Biological, and Environmental Engineering (CBEE) offers three undergraduate programs: Chemical Engineering (CHE), Bioengineering (BIOE), and Environmental Engineering (ENVE). The Bachelor of Science degrees in CHE, BIOE, and ENVE are each separately accredited by ABET, the Accreditation Board for Engineering and Technology. The Bachelor of Art degrees in CHE, BIOE, and ENVE are not accredited by ABET.

About Bioengineering

Bioengineering is an interdisciplinary field that applies engineering principles and quantitative methods to the development of new and novel biologicals, materials, devices, and processes. In practice, bioengineers address issues surrounding the broad areas of bioprocess, biomedical, and bioenvironmental technology.

About the OSU Bioengineering Undergraduate Program (BIOE)

The Bioengineering Undergraduate Program provides a solid background in biology, chemistry, physics and math, in addition to the engineering sciences. Upper-level course work in bioengineering includes analysis and design of processes involving suspension and immobilized microbial cultures and the recovery of therapeutic products from bioreactors, as well as selection courses in biomedical materials engineering, metabolic engineering, and cell engineering. All students complete course work in drug and medical device regulation as well as a capstone-design experience.

Bioengineering graduates are prepared to contribute to the rapidly growing bioscience-based industries with the ability to formulate and solve problems pertaining to enzyme and microbial process technologies, mammalian cell culture, and downstream processing in biotechnology. They also generate solutions to problems with medical relevance, including the design of devices and systems to replace lost organ function, deliver therapeutic agents, and otherwise improve human health.

The Bioengineering Undergraduate Program aims to create work- and leadership-ready graduates who will be successful in professional careers in the private or public sectors. The educational objectives of the Bioengineering program are:

- Graduates will be work-ready bachelor of science engineers who are successful in obtaining employment in the bioprocess and biotechnology industries, in entering graduate studies in bioengineering, chemical, environmental, and biomedical engineering, and gaining admission to professional schools including health-professional programs and law programs.
- Graduates will be able to solve problems at the interface of engineering and biology, whether in a manufacturing, research or clinical environment.
- Graduates will be motivated to pursue lifelong learning efforts in order to fulfill their professional and ethical responsibilities, and they will recognize their responsibility to understand contemporary questions at the interface of biosciences,

- technology, and society.
- Graduates will be able to effectively communicate with a diverse set of professionals, able to facilitate meaningful collaboration between bioscientists and other engineers.
- Graduates will have careers that significantly contribute to society no matter the direction or environment they choose because of their broad education based in science and engineering.

The Bioengineering undergraduate curriculum is designed to meet these objectives through relevant course content, hands-on laboratory and design experiences at the first year through the senior levels, and structured, collaborative learning experiences. The school has a core curriculum where students from all three programs housed within the school (CHE, BIOE, ENVE) take common courses in the areas of first-year engineering, materials and energy balances, thermodynamics, transport phenomena and senior laboratory.

Pre-Professional Bioengineering

First Year

- CBEE 101. Chemical, Biological, and Environmental Engineering Orientation (3)
 CBEE 102. Engineering Problem Solving and Computations (3)^E
 CH 231. *General Chemistry (4)^E
and CH 261. *Laboratory for Chemistry 231 (1)^E
 CH 232, CH 233. *General Chemistry (4,4)
and CH 262, CH 263. *Laboratory for Chemistry 232, 233 (1,1)
 COMM 111. *Public Speaking (3)
 or COMM 114. *Argument and Critical Discourse (3)^E
 MTH 251. *Differential Calculus (4)^E
 MTH 252. Integral Calculus (4)^E
 MTH 254. Vector Calculus I (4)^E
 PH 211. *General Physics with Calculus (4)^E
 WR 121. *English Composition (3)^E
 *Biology selection (2 or 4)¹
 *Perspectives (3)

Second Year

- CBEE 211. Material Balances and Stoichiometry (3)
 CBEE 212. Energy Balances (3)
 CBEE 213. Process Data Analysis (4)
 CH 331, CH 332. Organic Chemistry (4,4)
 ENGR 201. Electrical Fundamentals I (3)^E
 ENGR 211. Statics (3)^E
 HHS 231. *Lifetime Fitness for Health (2)
 HHS 241–HHS 248. *Lifetime Fitness (various activities) (1)
 or any PAC course (1–2)
 MTH 256. Applied Differential Equations (4)^E
 MTH 306. Matrix and Power Series Methods (4)^E
 PH 212, PH 213. *General Physics with Calculus (4,4)^E
 Z 331, Z 333. Human Anatomy and Physiology (3,3)

Professional Engineering Program

Third Year

- BB 450, BB 451. General Biochemistry (4,3)

- CBEE 320. Professionalism and Engineering Ethics (3)
 BIOE 340. Biomedical Engineering Principles (3)
 BIOE 390. Bioengineering Product Design (4)
 BIOE 420. Social Justice, Ethics, and Engineering (3)
 CHE 311. Thermodynamics (3)
 CHE 331. Transport Phenomena I (4)
 CHE 332. Transport Phenomena II (3)
 CHE 333. Transport Phenomena III (3)
 CHE 334. Transport Phenomena Laboratory (2)
 WR 327. *Technical Writing (3)
 *Difference, Power, and Discrimination (3)⁴
 Engineering electives (6)²
 *Perspectives (3)

Fourth Year

- BB 493. Biochemistry Laboratory (3)
 BB 494. Biochemistry Laboratory (3)
 CBEE 414. ^Process Engineering Laboratory (3)
 BIOE 415. Bioengineering Laboratory (3)
 BIOE 457. Bioreactors I (3)
 BIOE 462. Bioseparations (3)
 BIOE 470. Regulation of Drugs and Medical Devices (2)
 BIOE 490. ^Bioengineering Process Design (4)
 Bioengineering electives (6)³
 Engineering elective (3)²
 *Perspectives (6)
 *Synthesis (6)

Total Credits=190

Footnotes:

- *Bacc Core Course
 ^ Writing Intensive Course (WIC)
^E Required for entry into the professional program.
¹ Approved bioscience course from BIOE program list.
² Approved engineering elective from BIOE program list.
³ Approved bioengineering elective from BIOE program list.
⁴ Approved DPD elective from BIOE program list.

CHEMICAL ENGINEERING (BA, BS, CRED, HBA, HBS)

The School of Chemical, Biological, and Environmental Engineering (CBEE) offers three undergraduate programs: Chemical Engineering (CHE), Bioengineering (BIOE), and Environmental Engineering (ENVE). The Bachelor of Science degrees in CHE, BIOE, and ENVE are each separately accredited by ABET, the Accreditation Board for Engineering and Technology. The Bachelor of Art degrees in CHE, BIOE, and ENVE are not accredited by ABET.

About the Chemical Engineering Undergraduate Program (CHE):

Chemical engineering is the engineering discipline that focuses on the science and engineering of processes to convert raw materials into valued chemicals and products at a manufacturing scale. These include products found in everyday life such as transportation and heating fuels,

plastics, pharmaceuticals, household and paper products (soaps, cosmetics, health care and cleaning products, etc.), as well as more advanced products like solar cells, computer chips, and advanced composites for jet aircraft.

Chemical engineers find employment in traditional chemical industries such as pulp and paper manufacturing and petroleum refining, high-tech industries such as semiconductor device manufacturing, biopharmaceutical production, aerospace, and emerging industries, particularly in sustainable energy.

The overall goal of the chemical undergraduate engineering program is to create work- and leadership-ready graduates that will be successful in professional careers as a chemical engineer in the private or public sectors. The educational objectives of the chemical engineering undergraduate program are to:

- Provide CHE graduates with the fundamental knowledge, tools, skills, and perspectives to enable success for professional positions as a chemical engineer in industry, government, or for graduate study in chemical engineering or a field related to chemical engineering.
- Provide CHE graduates with a solid academic foundation in mathematics, chemical and physical sciences, and chemical process engineering principles in order to critically integrate and synthesize knowledge, think creatively, and design appropriate solutions to unfamiliar problems, all in a chemical engineering context.
- Develop the ability of CHE graduates to communicate effectively, and to work collaboratively in diverse team environments.
- Develop an awareness and understanding of broader aspects of the engineering profession for our CHE graduates, including: the need for lifelong learning, particularly with respect to acquiring new technical knowledge and information on current professional practices; understanding contemporary issues, including the impact of engineering actions in a societal and global context; understanding of professional and ethical responsibilities.

The chemical engineering undergraduate curriculum is designed to meet these objectives through relevant course content, hands-on laboratory and design experiences at the first year through senior levels, and structured, collaborative learning experiences. The school has a core curriculum where students from all three programs housed within the school (CHE, BIOE, ENVE) take common courses in the areas of first-year engineering,

material and energy balances, thermodynamics, transport phenomena, and senior year laboratory.

Chemical engineering students have opportunities to obtain internships offered through the School of CBEE, and through the Multiple Engineering Cooperative Program (MECOP) program. Many scholarships are also available on a competitive basis for chemical engineering undergraduate students.

The chemical engineering undergraduate program offers four options, which provides students with the opportunity to obtain a 21-credit, transcript-visible concentration in the following areas:

- Biochemical Processes
- Environmental Processes
- Microelectronics Processes and Materials Science
- Nanotechnology Processes

The option is not a requirement for the BS degree in Chemical Engineering. However, students interested in pursuing an option are encouraged to declare the option immediately after admission into the professional program, as many of the courses in a given option are only offered once per year.

Pre-Professional Chemical Engineering

First Year

CBEE 101. Chemical, Biological, and Environmental Engineering Orientation (3)

CBEE 102. Engineering Problem Solving and Computations (3)^E

CH 231. *General Chemistry (4)^E

and CH 261. *Laboratory for Chemistry 231 (1)^E

CH 232, CH 233. *General Chemistry (4,4)

and CH 262, CH 263. *Laboratory for Chemistry 232, 233 (1,1)

MTH 251. *Differential Calculus (4)^E

MTH 252. Integral Calculus (4)^E

MTH 254. Vector Calculus I (4)^E

PH 211. *General Physics with Calculus (4)^E

WR 121. *English Composition (3)^E

Biological science baccalaureate core lab course (4)

HHS 231. *Lifetime Fitness for Health (2)¹

HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)¹ or any PAC course (1–2)

Second Year

CH 331, CH 332. Organic Chemistry (4,4)

CBEE 211. Material Balances and Stoichiometry (3)

CBEE 212. Energy Balances (3)

CBEE 213. Process Data Analysis (4)

COMM 111. *Public Speaking (3)^E or COMM 114. *Argument and Critical Discourse (3)^E

ENGR 201. Electrical Fundamentals I (3)^E

ENGR 211. Statics (3)^E

MTH 256. Applied Differential Equations (4)^E

MTH 306. Matrix and Power Series Methods (4)^E

PH 212, PH 213. *General Physics with Calculus (4,4)^E

WR 327. *Technical Writing (3)

Professional Chemical Engineering

Third Year

CH 440, CH 441, CH 442. Physical Chemistry (3,3,3)²

CHE 311. Thermodynamics (3)

CHE 312. Chemical Engineering Thermodynamics (3)

CHE 320. Safety, Engineering Ethics and Professionalism (3)

CHE 331. Transport Phenomena I (4)

CHE 332. Transport Phenomena II (3)

CHE 333. Transport Phenomena III (3)

CHE 334. Transport Phenomena Laboratory (2)

CHE 361. Chemical Process Dynamics and Simulation (3)

CHE 461. Process Control (3)

Perspectives (9)¹

Option courses (6)

Fourth Year

CHE 411. Mass Transfer Operations (4)

CBEE 414. ^Process Engineering Lab (3)

CHE 415. Chemical Engineering Lab I (3)

CHE 431, CHE 432. Chemical Plant Design I, II (3,3)

CHE 443. Chemical Reaction Engineering (4)

Electives (7)

Option courses (9)

Perspectives (6)¹

Synthesis (6)¹

Total Credits=180

Footnotes:

^E Required for entry into the professional program.

¹ Must be selected to satisfy the requirements of the baccalaureate core

² CH 440 is not required for students completing an option.

^ Writing Intensive Course (WIC)

* Bacc Core Course that satisfies baccalaureate core requirements

OPTIONS

BIOCHEMICAL PROCESSES OPTION

BB 450. General Biochemistry (4)

BB 451. General Biochemistry (3)

BIOE 457. Bioreactors I (3)

CH 324. Quantitative Analysis (4)

or CHE 417. Instrumentation in Chemical, Biological, and Environmental Engineering (4)

Select at least 9 credits from the following:

BIOE 451. Biomaterials and Biointerfaces (3)

BIOE 459. ^Cell Engineering (3)

BIOE 462. Bioseparations (3)

CHE 416. Chemical Engineering Lab II (3)

Total=23 Credits

Footnote:

^ Writing Intensive Course (WIC)

ENVIRONMENTAL PROCESSES OPTION

CH 324. Quantitative Analysis (4)

or CHE 417. Instrumentation in Chemical, Biological, and Environmental Engineering (4)

ENVE 322. Fundamentals of Environmental Engineering (4)

ENVE 431. Fate and Transport of Chemicals in Environmental Systems (4)

Select three additional courses from the following:

BB 350. Elementary Biochemistry (4)

CE 412. Hydrology (4)

CH 422. Analytical Chemistry (3)

CBEE 416. Chemical Engineering Lab II (3)

ENVE 421. Water and Wastewater Characterization (4)

ENVE 422. Environmental Engineering Design (4)

ENVE 425. Air Pollution Control (3)

ENVE 456. Sustainable Water Resources Development (3)

TOX 430. Chemical Behavior in the Environment (3)

Total=21 Credits

MICROELECTRONICS PROCESSES AND MATERIALS SCIENCE OPTION

CH 324. Quantitative Analysis (4)

or CHE 417. Instrumentation in Chemical, Biological, and Environmental Engineering (4)

CHE 444. Thin Film Materials Processing (4)

CHE 445. Polymer Engineering and Science (4)

Select three additional courses from the following:

BIOE 451. Biomaterials and Biointerfaces (3)

CBEE 416. Chemical Engineering Lab II (3)

CH 411. Inorganic Chemistry (3–4)

CH 421. Analytical Chemistry (3)

CH 422. Analytical Chemistry (3)

CH 445. Physical Chemistry of Materials (3)

CHE 417. Instrumentation in Chemical, Biological, and Environmental Engineering (4)

ECE 416. Electronic Materials and Devices (4)

ECE 417. Basic Semiconductor Devices (3)

ECE 418. Semiconductor Processing (4)

ENGR 221. The Science, Engineering and Social Impact of Nanotechnology (3)

ENGR 321. Materials Science (4)

ENGR 322. Mechanical Properties of Materials (3)

IE 355. Statistical Quality Control (4)

IE 356. Experimental Design for Industrial Processes (4)

Total=21 Credits

NANOTECHNOLOGY PROCESSES OPTION

CBEE 416. Chemical Engineering Laboratory II (3)

CHE 417. Instrumentation in Chemical, Biological, and Environmental Engineering (4)

CHE 444. Thin Films Materials Processing (4)

ENGR 221. The Science, Engineering and Social Impact of Nanotechnology (3)¹

Select one course from the following:

BIOE 451. Biomaterials and Biointerfaces (3)

CH 445. Physical Chemistry of Materials (3)

ECE 416. Electronic Materials and Devices (4)

ECE 418. Semiconductor Processing (3)
 ENGR 321. Materials Science (3)
 IE 355. Statistical Quality Control (4)
 IE 356. Experimental Design for Industrial Processes (4)

Total=21 Credits

Footnote

¹ If ENGR 221 is being used to fulfill the engineering ethics requirement, an additional Nanotechnology Processes option course must be selected.

ENVIRONMENTAL ENGINEERING (BA, BS, CRED, HBA, HBS)

The School of Chemical, Biological, and Environmental Engineering (CBEE) offers three undergraduate programs: Chemical Engineering (CHE), Bioengineering (BIOE), and Environmental Engineering (ENVE). The Bachelor of Science degrees in CHE, BIOE, and ENVE are each separately accredited by ABET, the Accreditation Board for Engineering and Technology. The Bachelor of Art degrees in CHE, BIOE, and ENVE are not accredited by ABET.

The school also offers an undergraduate Environmental Engineering option for civil engineering students and a minor in Environmental Engineering.

About the Environmental Engineering Undergraduate Program (ENVE)

The ENVE program draws upon a strong foundation in the basic sciences and prepares students for environmental engineering careers in consulting, industry, and state and local governments. It is a rigorous program incorporating course work in civil and chemical engineering, water and wastewater treatment, hazardous substance management, air pollution, and environmental health. The concept of environmental engineering design is introduced during the freshman year, with most of the design skills developed at the junior and senior level. Training culminates in a team approach to solution of open-ended, realistic problems that incorporate aspects of economics, process operation and maintenance, process stability and reliability, and consideration of constraints. A more detailed explanation of the design experience and design course sequences is contained in the "Undergraduate Advising Guide for the Environmental Engineering Program," which may be obtained from the school or viewed on the school's website at http://cbee.oregonstate.edu/students/current/advising/enve_advising_guide.pdf.

The educational objectives of the environmental engineering undergraduate program are that our graduates will:

1. Be employable in the field of environmental engineering or prepared for advanced graduate education with a specialty of

- environmental engineering.
2. Be proficient at mathematics, basic sciences, and engineering sciences relevant to environmental engineering, including fundamental concepts, experimental techniques, methods of analysis, and computational applications.
3. Be able to formulate and solve problems, synthesize and evaluate information, and be prepared for modern environmental engineering design.
4. Communicate effectively and work collaboratively in diverse teams.
5. Have awareness of and dedication to life-long learning in their careers by understanding the evolution of knowledge and technical applications, the state of current professional practice, contemporary issues, their professional and ethical responsibilities, and the impact of engineering actions in a societal and global context

The environmental engineering undergraduate curriculum is designed to meet these objectives through relevant course content, hands-on laboratory and design experiences at the first year through senior levels, and structured, collaborative learning experiences. The school has a core curriculum where students from all three programs housed within the school (CHE, BIOE, ENVE) take common courses in the areas of first-year engineering, materials and energy balances, thermodynamics, transport phenomena, and senior year unit operations.

Environmental engineering students have opportunities to obtain internships offered through the School of CBEE, and through the College of Engineering Multiple Engineering Cooperative Program (MECOP) program. Many scholarships are also available on a competitive basis for environmental engineering undergraduate students.

Pre-professional Environmental Engineering

First Year

- CBEE 101. Chemical, Biological, and Environmental Engineering Orientation (3)⁵
 CBEE 102. Engineering Problem Solving and Computations (3)^E
 CH 231^E, CH 232, CH 233. *General Chemistry (4,4,4)⁵
 and CH 261, CH 262, CH 263.
 *Laboratory for Chemistry 231, 232, 233 (1,1,1)
 COMM 111. *Public Speaking (3)^E
 or COMM 114. *Argument and Critical Discourse (3)^E
 HHS 231. *Lifetime Fitness for Health (2)¹
 HHS 241–HHS 248. *Lifetime Fitness (various options) (1)¹
 or any PAC course (1–2)
 MTH 251. *Differential Calculus (4)^E
 MTH 252. Integral Calculus (4)^E
 MTH 254. Vector Calculus I (4)^E

PH 211. *General Physics with Calculus (4)^E
 WR 121. *English Composition (3)^E

Second Year

CBEE 211. Material Balances and Stoichiometry (3)⁵
 CBEE 212. Energy Balances (3)⁵
 CBEE 213. Process Data Analysis (4)⁵
 CH 331, CH 332. Organic Chemistry (4,4)
 ENGR 211. Statics (3)^E
 ENGR 212. Dynamics (3)^E
 ENGR 213. Strength of Materials (3)⁵
 GEO 221. Environmental Geology (4)
 MTH 256. Applied Differential Equations (4)^E
 MTH 306. Matrix and Power Series Methods (4)^E
 PH 212, PH 213. *General Physics with Calculus (4,4)^E
 Perspective (3)¹

Professional Environmental Engineering

Third Year

CBEE 320. Professionalism and Engineering Ethics (3)
 CCE 201. Civil and Construction Engineering Graphics and Design (3)⁵
 CE 313. Hydraulic Engineering (4)
 or CE 372. Geotechnical Engineering I (4)
 CE 412. Hydrology (4)
 CHE 311. Thermodynamics (3)
 CHE 331. Transport Phenomena I (3)
 CHE 332. Transport Phenomena II (3)
 CHE 333. Transport Phenomena III (3)
 CHE 334. Transport Laboratory (2)
 ENVE 322. Fundamentals of Environmental Engineering (4)
 MB 230. *Introductory Microbiology (4)
 WR 327. *Technical Writing (3)¹
 Perspectives (9)¹

Fourth Year

BIOE 457. Bioreactors I (3)
 CBEE 414. Process Engineering Laboratory (3)
 ENVE 415. Environmental Engineering Laboratory (3)
 ENVE 421. Water and Wastewater Characterization (4)
 ENVE 422. Environmental Engineering Design (4)
 ENVE 425. Air Pollution Control (3)
 ENVE 431. Fate and Transport of Chemicals in Environmental Systems (4)
 ENVE 456. Sustainable Water Resources Development (3)
 ENVE 490. Environmental Engineering Capstone Design (4)
 Perspective (3)¹
 Synthesis (6)¹
 Technical electives (7)

Total Credits=192

Footnotes:

^E Required for entry into the professional program.

¹ Must be selected to satisfy the requirements of the baccalaureate core.

⁵ Prerequisite for several upper-division courses. Recommended for completion prior to entry into the professional program or in fall term of junior year.

**ENVIRONMENTAL
ENGINEERING MINOR****Minor Core Courses (21)**

CH 123. *General Chemistry (5)
or CH 233. *General Chemistry (4) *and*
CH 263. *Laboratory for Chemistry 233 (1)
ENVE 421. Water and Wastewater
Characterization (4)
ENVE 422. Environmental Engineering
Design (4)
ENVE 431. Fate and Transport of Chemicals
in Environmental Systems (4)

Additional core courses (6)

ENVE 321. ^Environmental Engineering
Fundamentals (4)
Approved electives (2)

Total=27

Contact the School of Chemical, Biological
and Environmental Engineering for a
list of approved elective courses.

GRADUATE MAJORS**CHEMICAL ENGINEERING
(MEng, MS, PhD)****Graduate Areas of Concentration**
Chemical engineering

The School of Chemical, Biological and
Environmental Engineering offers gradu-
ate programs leading to the Master of En-
gineering, Master of Science, and Doctor
of Philosophy degrees. All programs are
tailored to individual student needs and
professional goals. A diversity of faculty
interests, broadened and reinforced by
cooperation between the school and oth-
er engineering departments and schools
and research centers on campus, makes
tailored individual programs possible.
The school originates and encourages
programs ranging from those that are
classically chemical engineering to those
that are distinctly interdisciplinary.

For more information, contact Dr.
Gregory Rorrer, School Head, School of
Chemical, Biological and Environmental
Engineering, Oregon State University,
Corvallis, OR 97331-2904, or email
cbee@oregonstate.edu.

MEng Degree (45 credits)**Chemical Engineering Core (21)**

CHE 514. Fluid Flow (4)
CHE 520. Mass Transfer I (4)
CHE 525. Chemical Engineering Analysis
CHE 537. Chemical Engineering
Thermodynamics I (4)
CHE 540. Chemical Reactors I (4)
CHE 507. Seminar (1)

Engineering Electives (9)

Graduate level courses offered through the
College of Engineering

Minor Course Work/Electives (15)

Courses approved by graduate program
advisor on Graduate Program of Study

MS Degree (45 credits)**Chemical Engineering Core (21)**

CHE 514. Fluid Flow (4)
CHE 520. Mass Transfer I (4)

CHE 525. Chemical Engineering Analysis
(4)
CHE 537. Chemical Engineering
Thermodynamics I (4)
CHE 540. Chemical Reactors I (4)
CHE 507. Seminar (1)

Minor Course Work/Electives (15)

Courses approved by MS Thesis advisor on
Graduate Program of Study

Thesis (9)**PhD Degree (108 credits)****Chemical Engineering Core (21)**

CHE 514. Fluid Flow (4)
CHE 520. Mass Transfer I (4)
CHE 525. Chemical Engineering Analysis (4)
CHE 537. Chemical Engineering
Thermodynamics I (4)
CHE 540. Chemical Reactors I (4)
CHE 507. Seminar (1)

Minor Course Work/Electives (15+)

Courses approved by student PhD Com-
mittee on Graduate Program of Study

Thesis (36–72)**Prerequisite and Corequisite
Course Work for Non-engineering
Undergraduates**

MEng or MS students without undergrad-
uate degrees in chemical engineering or
a related engineering discipline, or PhD
students without undergraduate degrees
or graduate degrees in chemical engineer-
ing or a related engineering discipline,
must take the following courses in addi-
tion to the CHE core:

CBEE 211. Material Balances and
Stoichiometry (3)
CBEE 212. Energy Balances (3)
CHE 312. Chemical Engineering
Thermodynamics (3)
CHE 331. Transport Phenomena I (4)
CHE 332. Transport Phenomena II (3)
CHE 443. Chemical Reaction Engineering (4)

**ENVIRONMENTAL ENGINEERING
(MEng, MS, PhD, MAIS)****Graduate Areas of Concentration**

*Bioremediation, environmental fluid
mechanics, environmental microbiology,
environmental modeling, multiphase
phenomena, subsurface flow and
transport, water and wastewater
treatment*

The School of Chemical, Biological
and Environmental Engineering offers
graduate curricula leading to the Master
of Engineering, Master of Science, and
Doctor of Philosophy degrees in Environ-
mental Engineering. The ENVE program
prepares individuals to apply mathemat-
ical and scientific principles to the design,
development and operational evaluation
of systems for controlling contained
living environments and for monitoring
and controlling factors in the external
natural environment. Specific application
areas include pollution control, waste
and hazardous material disposal, health
and safety protection, conservation, life
support, and requirements for protec-

tion of special materials and related work
environments, as well as emerging areas
including sustainability, detection and
treatment of emerging contaminants
and their fate in the natural environ-
ment, water supply for a growing world
population, and mitigation of the ef-
fects of climate change, among others.
All programs are tailored to individual
student needs and professional goals. A
diversity of faculty interests, broadened
and reinforced by cooperation between
the school and other engineering depart-
ments and schools, and research centers
on campus, makes tailored individual
programs possible.

For more information, contact Dr.
Gregory Rorrer, School Head, School of
Chemical, Biological and Environmental
Engineering, Oregon State University,
Corvallis, OR 97331-2904, or email
cbee@oregonstate.edu.

MEng Degree (45 credits)**Environmental Engineering Core (20)**

ENVE 532. Aquatic Chemistry: Natural and
Engineered Systems (4)
ENVE 535. Physical and Chemical Processes
for Hazardous Waste Treatment (4)
ENVE 536. Aqueous Environmental
Chemistry Laboratory (1)
ENVE 541. Microbial Processes in
Environmental Systems (4)
CHE 507. Seminar (F, W, S) (3)
CHE 525. Chemical Engineering Analysis (4)
**Engineering electives include at least
one of the following (10)**
ENVE 525. Air Pollution Control (3)
ENVE 531. Fate and Transport of
Chemicals in Environmental Systems (4)
ENVE 556. Sustainable Water Resources
Development (3)

Minor Course Work/Electives (15)**MS Degree (45 credits)****Environmental Engineering Core
Courses (20)**

ENVE 532. Aquatic Chemistry: Natural and
Engineered Systems (4)
ENVE 535. Physical and Chemical Processes
for Hazardous Waste Treatment (4)
ENVE 536. Aqueous Environmental
Chemistry Laboratory (1)
ENVE 541. Microbial Processes in
Environmental Systems (4)
CHE 507. Seminar (F, W, S) (3)
CHE 525. Chemical Engineering Analysis (4)

Minor Course Work/Electives (16–19)**Thesis (6–9)****PhD Degree (108 credits)****Environmental Engineering Core (20)**

ENVE 532. Aquatic Chemistry: Natural and
Engineered Systems (4)
ENVE 535. Physical and Chemical Processes
for Hazardous Waste Treatment (4)
ENVE 536. Aqueous Environmental
Chemistry Laboratory (1)
ENVE 541. Microbial Processes in
Environmental Systems (4)
CHE 507. Seminar (F, W, S) (3)
CHE 525. Chemical Engineering Analysis (4)

Minor Course Work/Electives (16+)

(Exact requirement determined by the student's program committee)

Thesis (36-72)**Prerequisite and Corequisite Course Work for Non-engineering Undergraduates**

MEng, MS, or PhD students without undergraduate degrees in environmental engineering or a related engineering discipline must take the following courses in addition to the ENVE core:

Prerequisite Courses:**Completion required before taking ENVE core courses:**

Math through differential equations

One year of general chemistry

One year of physics

CBEE 211. Material Balances and Stoichiometry (3)

Corequisite Courses:

CE 547. Water Resources Engineering I: Principles of Fluid Mechanics (4)

ENVE 521. Water and Wastewater Characterization (4)

ENVE 522. Environmental Engineering Design (4)

ENVE 531. Fate and Transport of Chemicals in Environmental Systems (4)

Note: ENVE 521 and ENVE 522 will not count towards the credit requirements for the MEng, MS, and PhD degrees.

CHEMICAL ENGINEERING GRADUATE MINOR

For more details, see the school advisor.

ENVIRONMENTAL ENGINEERING GRADUATE MINOR

For more information, contact Dr. Gregory Rorrer, School Head, School of Chemical, Biological and Environmental Engineering, Oregon State University, Corvallis, OR 97331-2904, or email cbee@oregonstate.edu.

BIOLOGICAL ENGINEERING COURSES

BIOE 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

BIOE 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

BIOE 340. BIOMEDICAL ENGINEERING PRINCIPLES (3). Application of engineering concepts (mass and energy conservation, thermodynamics, and transport phenomena) to cellular- and system-level human physiology; design considerations for biomedical interventions and devices. Lec/lab. **PREREQS:** CHE 332 and Z 331 and Z 333

BIOE 390. BIOENGINEERING PRODUCT DESIGN (4). Design of biomedical products. Development of process flow diagrams, control strategies, process simulators, and financial analysis of processes. This course focuses on a term-long report. **PREREQS:** CHE 332

BIOE 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

BIOE 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

BIOE 403. THESIS (1-16). **PREREQS:** Departmental approval required.

BIOE 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

BIOE 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

BIOE 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

BIOE 415. BIOENGINEERING LABORATORY (3). Laboratory performance of unit operations and processes in bioseparations; preparation of technical reports. **PREREQS:** ((CHE 414 or CHE 414H) or (BIOE 414 or BIOE 414H) or (ENVE 414 or ENVE 414H) or CBEE 414)

BIOE 420. SOCIAL JUSTICE, ETHICS, AND ENGINEERING (3). Examination of difference, power, and discrimination in engineering education and practice. Lec/rec. **PREREQS:** Upper-division standing in engineering.

BIOE 451. BIOMATERIALS AND BIOINTERFACES (3). Material interactions with human tissue, with emphasis on the role of interfacial chemistry and physics in cell adhesion, infection, blood coagulation and thrombosis. Preparation of functional hydrogels, material coatings, and derivatizations, including immobilized bio-active molecules. Issues surrounding regulation of implants and device failure. Lec/rec. **PREREQS:** BB 451 and CHE 332

BIOE 457. BIOREACTORS I (3). Design and analysis of bioreactors using suspension and immobilized microbial cultures. **PREREQS:** (BB 451 and CHE 332) and .

BIOE 459. CELL ENGINEERING (3). Application of engineering methods and principles to the study of mammalian cells. Emphasis on mathematical models of cellular processes (e.g. cellular mass transport, protein-ligand interactions, cellular mechanics) and methods for probing the physical characteristics of biological molecules and cells. **PREREQS:** BB 451 and CHE 332

BIOE 462. BIOSEPARATIONS (3). Application of basic mass transfer, reaction kinetics and thermodynamic principles to understanding, selection, and development of strategies for the recovery of products from bioreactors. **PREREQS:** (BB 451 and CHE 332) and .

BIOE 470. REGULATION OF DRUGS AND MEDICAL DEVICES (2). Overview of regulations for pharmaceutical products and medical devices. Food and Drug Administration's approval process. Current good manufacturing practices and process validation is emphasized. Quality control and assurance, compliance, and important analytical methods will be introduced. **PREREQS:** Upper-division standing in engineering.

BIOE 490. ^BIOENGINEERING PROCESS DESIGN (4). Design of bioprocesses.

Development of process flow diagrams, control strategies, process simulators, and financial analysis of processes. Focuses on a term-long design report. (Writing Intensive Course) **PREREQS:** BIOE 457 and BIOE 462

BIOE 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

BIOE 520. SOCIAL JUSTICE, ETHICS, AND ENGINEERING (3). Examination of difference, power, and discrimination in engineering education and practice. Lec/rec. **PREREQS:** Upper-division standing in engineering.

BIOE 551. BIOMATERIALS AND BIOINTERFACES (3). Material interactions with human tissue, with emphasis on the role of interfacial chemistry and physics in cell adhesion, infection, blood coagulation and thrombosis. Preparation of functional hydrogels, material coatings, and derivatizations, including immobilized bio-active molecules. Issues surrounding regulation of implants and device failure. Lec/rec. **PREREQS:** BB 451 and CHE 332

BIOE 557. BIOREACTORS I (3). Design and

analysis of bioreactors using suspension and immobilized microbial cultures. **PREREQS:** BB 451 and CHE 332

BIOE 559. CELL ENGINEERING (3). Application of engineering methods and principles to the study of mammalian cells. Emphasis on mathematical models of cellular processes (e.g. cellular mass transport, protein-ligand interactions, cellular mechanics) and methods for probing the physical characteristics of biological molecules and cells. **PREREQS:** BB 451 and CHE 332

BIOE 562. BIOSEPARATIONS (3). Application of basic mass transfer, reaction kinetics and thermodynamic principles to understanding, selection, and development of strategies for the recovery of products from bioreactors. **PREREQS:** BB 451 and CHE 332

BIOE 570. REGULATION OF DRUGS AND MEDICAL DEVICES (2). Overview of regulations for pharmaceutical products and medical devices. Food and Drug Administration's approval process. Current good manufacturing practices and process validation is emphasized. Quality control and assurance, compliance, and important analytical methods will be introduced. **PREREQS:** Upper-division standing in engineering.

BIOE 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

CHEMICAL, BIOLOGICAL AND ENVIRONMENTAL ENGINEERING COURSES

CBEE 101. CHEMICAL, BIOLOGICAL, AND ENVIRONMENTAL ENGR ORIENTATION (3). Introduction to the engineering profession in general and in particular the CHE, BIOE, and ENVE programs; development of problem solving strategies and teamwork; analysis and presentation of experimental data, basic process calculations, and design methodologies. Lec/rec/lab.

CBEE 101H. CHEMICAL, BIOLOGICAL, AND ENVIRONMENTAL ENGR ORIENTATION (3). Introduction to the engineering profession in general and in particular the CHE, BIOE, and ENVE programs; development of problem solving strategies and teamwork; analysis and presentation of experimental data, basic process calculations, and design methodologies. Lec/rec/lab. **PREREQS:** Honors College approval required.

CBEE 102. ENGINEERING PROBLEM SOLVING AND COMPUTATIONS (3). Elementary programming and problem-solving concepts implemented using MATLAB and Excel software; emphasis on problem analysis and development of algorithms in engineering. Lec/lab. **PREREQS:** MTH 112 or MTH 251 or MTH 251H

CBEE 102H. ENGINEERING PROBLEM SOLVING AND COMPUTATIONS (3). Elementary programming and problem-solving concepts implemented using MATLAB and Excel software; emphasis on problem analysis and development of algorithms in engineering. Lec/lab. **PREREQS:** MTH 112 or MTH 251 or MTH 251H

CBEE 211. MATERIAL BALANCES AND STOICHIOMETRY (3). Material balances, thermophysical, and thermochemical calculations. Lec/rec. **PREREQS:** (MTH 252 or MTH 252H) and general chemistry and second-year standing in engineering.

CBEE 212. ENERGY BALANCES (3). Energy balances, thermophysical and thermochemical calculations. Lec/rec. **PREREQS:** (CBEE 211 or BIOE 211 or CHE 211 or ENVE 211) and one year general chemistry and second-year standing in engineering.

CBEE 213. PROCESS DATA ANALYSIS (4). Applications of material and energy balances, with an emphasis on data analysis important to chemical engineers, bioengineers, and environmental engineers. Contextual learning is

emphasized through the laboratory component and the use of process flow simulation modeling and analysis software. Lec/lab/rec. **PREREQS:** (CBEE 212 or BIOE 212 or CHE 212 or ENVE 212)

CBEE 320. PROFESSIONALISM AND ENGINEERING ETHICS (3). Introduction to engineering ethics. Topics include ethical theory, professional engineering responsibility, codes of ethics, ethical assessment, conflicts of interest, risk and safety, loyalty and dissent, as well as overarching professional concerns. **PREREQS:** WR 121

CBEE 414. ^PROCESS ENGINEERING LABORATORY (3). Unit operations and unit processes; preparation of technical reports. Lec/lab/rec. (Writing Intensive Course) **PREREQS:** Fourth-year standing in BIOE/CHE/ENVE.

CBEE 416. CBEE LABORATORY II (3). Integration of overall knowledge of chemical, biological, and environmental engineering through group project activities culminating with public demonstration or display of project results. **PREREQS:** (CHE 415 or CHE 415H or BIOE 415 or ENVE 415)

■ CHEMICAL ENGINEERING COURSES

CHE 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 99 credits.

CHE 199H. SPECIAL TOPICS (1-16). **PREREQS:** Honors College approval required.

CHE 299. PROFESSIONAL WORKSKILLS (1-16). This course is repeatable for a maximum of 99 credits.

CHE 311. THERMODYNAMICS (3). Entropy, the second law of thermodynamics, equations of state, and thermodynamic network. **PREREQS:** ((CBEE 212 or CHE 212 or BIOE 212 or ENVE 212) and (MTH 256 or MTH 256H))

CHE 312. CHEMICAL ENGINEERING THERMODYNAMICS (3). Thermodynamic mixtures, fugacity, phase equilibrium, and chemical reactions equilibrium. **PREREQS:** CHE 311

CHE 320. SAFETY, ENGINEERING ETHICS AND PROFESSIONALISM (3). Introduction to engineering ethics and safety concepts. Topics include professional engineering responsibility, codes of ethics, ethical assessment, conflicts of interest, loyalty and dissent, life-long learning, hazard identification, risk and safety, and process safety management. Lec/rec. **PREREQS:** Engineering Professional School Standing (+16)

CHE 331. TRANSPORT PHENOMENA I (4). Fundamentals and application of momentum and energy transfer phenomena to fluid flow for the design of industrial chemical engineering equipment. **PREREQS:** ((MTH 256 or MTH 256H) and (CBEE 212* or BIOE 212 or CHE 212 or ENVE 212))

CHE 332. TRANSPORT PHENOMENA II (3). A unified treatment using control volume and differential analysis of heat transfer, prediction of heat transport properties, and introduction to heat transfer operations. **PREREQS:** (CHE 311 and CHE 331)

CHE 333. TRANSPORT PHENOMENA III (3). A unified treatment using control volume and differential analysis of binary mass transfer, prediction of mass transport properties, and introduction to mass transfer operations. Lec/studio. **PREREQS:** (CHE 331 or CHE 332)

CHE 334. TRANSPORT PHENOMENA LABORATORY (2). Engineering lab practices and the application of the macroscopic balances of mass, energy, and chemical species; fluid flow, heat and mass transfer experiments by teams for demonstrations of principles established in previous transport phenomena courses.

PREREQS: (CHE 331 and CHE 332)

CHE 361. CHEMICAL PROCESS DYNAMICS AND SIMULATION (3). Fundamental principles for process dynamic modeling used in the control of process variables such as pressure, temperature, flow rate and chemical composition. **PREREQS:** (MTH 256 or MTH 256H) and CHE 331* and CBEE 102 recommended.

CHE 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

CHE 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

CHE 403. THESIS (1-16). **PREREQS:** Departmental approval required.

CHE 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

CHE 405H. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

CHE 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

CHE 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

CHE 410. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits.

CHE 411. MASS TRANSFER OPERATIONS (4). Mass transfer operations; design of separation processes. Lec/rec. **PREREQS:** (CHE 312 and CHE 333)

CHE 415. CHEMICAL ENGINEERING LABORATORY I (3). Theoretical and empirical analysis of several unit operations, use of formal work processes, safety, teamwork, oral and written communication, and personal accountability. Lec/lab/rec. **PREREQS:** CBEE 414

CHE 415H. CHEMICAL ENGINEERING LABORATORY I (3). Theoretical and empirical analysis of several unit operations, use of formal work processes, safety, teamwork, oral and written communication, and personal accountability. Lab/rec. **PREREQS:** CBEE 414 and Honors College approval required.

CHE 417. INSTRUMENTATION IN CHEMICAL, BIOLOGICAL, & ENVIRONMENTAL ENG (4). Equips students with a toolbox of instrumental techniques important in chemical, biological, and environmental engineering and the background required to determine the appropriate instrumental technique to address a specific problem. Lec/lab/rec. **PREREQS:** (CH 231 and CH 261 and CH 232 and CH 262 and CH 233 and CH 263) and enrollment in chemical, biological or environmental engineering professional programs.

CHE 431. CHEMICAL PLANT DESIGN I (3). Short-cut techniques and other abbreviated and useful methods for specifying equipment sufficient for the preliminary design of processes and equipment; estimating capital and manufacturing costs based on equipment specifications. **PREREQS:** (CHE 312 and CHE 411 and CHE 443)

CHE 432. CHEMICAL PLANT DESIGN II (3). Transformation of preliminary design to detailed design; introduction to safety, ethical, economical, and environmental considerations in chemical plant design. Lec/rec. **PREREQS:** CHE 431

CHE 443. CHEMICAL REACTION ENGINEERING (4). Design of chemical reactors for economical processes and waste minimization. Contacting patterns, kinetics and transport rate effects in single phase and catalytic systems. **PREREQS:** ((MTH 256 or MTH 256H) and CHE 312 and CHE 332) and CHE graduate students may not enroll.

CHE 444. THIN FILM MATERIALS PROCESSING (4). Solid state devices are based on the patterning of thin films. This lecture and lab course

is primarily an introduction to the technology associated with processing thin films. Topics include chemical vapor deposition, physical vapor deposition, plasma etching, and thin-film characterization. Lec/lab/rec. **PREREQS:** CHE 443

CHE 445. POLYMER ENGINEERING AND SCIENCE (4). Polymer engineering and science with an emphasis on practical applications and recent developments. Topics include polymer synthesis, characterization, mechanical properties, rheology, and processing at a level suitable for most engineering and science majors. Lec/lab/rec. **PREREQS:** CH 334 and CH 335 and CH 336 or equivalent and MTH 256 and/or junior standing in engineering or science.

CHE 450. CONVENTIONAL AND ALTERNATIVE ENERGY SYSTEMS (3). Principles of energy conversion from chemical/mechanical energy to electrical energy including an overview of conventional energy systems and of likely renewable energy systems with a focus on the fundamental physico-chemical and thermodynamic concept for each technology. The economics of energy systems will also be discussed.

CHE 451. SOLAR ENERGY TECHNOLOGIES (3). A foundation in the principles of solar energy processes is provided. Topics covered include photovoltaics and solar thermal, and will cover the fundamental solid state physics of semiconductors to applied heat transfer analysis of solar collectors. The course objective is to equip students with an adequate depth of understanding of the operational principles of solar energy systems, and to cover the breadth of the various approaches employed in active solar energy systems. **PREREQS:** CHE 311 or equivalent.

CHE 461. PROCESS CONTROL (3). Principles of PID feedback control based on models of chemical processes; analysis and implementation of proportional, integral and derivative tuning; cascade, feedforward, ratio and deadtime compensation; multivariable control and control system design issues and methods. **PREREQS:** (CHE 331 and CHE 332* and CHE 361)

CHE 499. SPECIAL TOPICS (1-4). This course is repeatable for a maximum of 8 credits.

CHE 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

CHE 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

CHE 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

CHE 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

CHE 507. SEMINAR (1-16). One-credit seminar. Graded P/N. This course is repeatable for a maximum of 16 credits.

CHE 510. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits.

CHE 514. FLUID FLOW (4). Fundamentals of fluid dynamics for Newtonian and non-Newtonian fluids; flow through porous media; two-phase flow. Lec/rec.

CHE 517. INSTRUMENTATION IN CHEMICAL, BIOLOGICAL, & ENVIRONMENTAL ENG (4). Equips students with a toolbox of instrumental techniques important in chemical, biological, and environmental engineering and the background required to determine the appropriate instrumental technique to address a specific problem. Lec/lab/rec. **PREREQS:** (CH 231 and CH 261 and CH 232 and CH 262 and CH 233 and CH 263) and enrollment in chemical, biological or environmental engineering professional programs.

CHE 520. MASS TRANSFER (4). Diffusion in gases, liquids, solids, membranes, and between phases. Effects of reactions on mass transfer.

Mass transfer rates by convection and dispersion. Rates of dispersion. Rates of combined heat and mass transfer.

CHE 525. CHEMICAL ENGINEERING ANALYSIS (4). Modeling of physical and chemical processes; mathematical analysis of models with appropriate advanced techniques.

CHE 537. CHEMICAL ENGINEERING THERMODYNAMICS I (4). Applications of the fundamental laws of thermodynamics to complex systems. Properties of solutions of non-electrolytes. Phase and chemical equilibrium.

CHE 540. CHEMICAL REACTORS I (4). Catalysis, reactions coupled with transport phenomena. Reactors for high tech applications.

CHE 543. CHEMICAL REACTION ENGINEERING (4). Design of chemical reactors for economical processes and waste minimization. Contacting patterns, kinetics and transport rate effects in single phase and catalytic systems. **PREREQS:** CHE 312 and CHE 332 and MTH 256. CHE graduate students may not enroll.

CHE 544. THIN FILM MATERIALS PROCESSING (4). Solid state devices are based on the patterning of thin films. This lecture and lab course is primarily an introduction to the technology associated with processing thin films. Topics include chemical vapor deposition, physical vapor deposition, plasma etching, and thin-film characterization. Lec/lab/rec. **PREREQS:** CHE 443 or CHE 543

CHE 545. POLYMER ENGINEERING AND SCIENCE (4). Polymer engineering and science with an emphasis on practical applications and recent developments. Topics include polymer synthesis, characterization, mechanical properties, rheology, and processing at a level suitable for most engineering and science majors. Lec/lab/rec. **PREREQS:** CH 334 and CH 335 and CH 336 or equivalent and MTH 256 and/or junior standing in engineering or science.

CHE 550. CONVENTIONAL AND ALTERNATIVE ENERGY SYSTEMS (3). Principles of energy conversion from chemical/mechanical energy to electrical energy including an overview of conventional energy systems and of likely renewable energy systems with a focus on the fundamental physico-chemical and thermodynamic concept for each technology. The economics of energy systems will also be discussed. **PREREQS:** (CHE 311 or ME 311 or ME 311H) and CHE 311 or ME 311 or ME 311H

CHE 551. SOLAR ENERGY TECHNOLOGIES (3). A foundation in the principles of solar energy processes is provided. Topics covered include photovoltaics and solar thermal, and will cover the fundamental solid state physics of semiconductors to applied heat transfer analysis of solar collectors. The course objective is to equip students with an adequate depth of understanding of the operational principles of solar energy systems, and to cover the breadth of the various approaches employed in active solar energy systems. **PREREQS:** CHE 311 or equivalent.

CHE 581. SELECTED TOPICS (3). Non-sequence course designed to acquaint students with recent advances in chemical engineering. Topics vary from term to term and from year to year. May be repeated for credit. This course is repeatable for a maximum of 9 credits.

CHE 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

CHE 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

CHE 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

CHE 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

CHE 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

CHE 611. ELECTRONIC MATERIALS PROCESSING (3). Technology, theory, and analysis of processing methods used in integration circuit fabrication. Offered alternate years. **CROSSLISTED** as ECE 611. **PREREQS:** Graduate standing or instructor approval.

CHE 612. PROCESS INTEGRATION (3). Process integration, simulation, and statistical quality control issues related to integrated circuit fabrication. Offered alternate years. **CROSSLISTED** as ECE 612. **PREREQS:** CHE 611 or ECE 611 or instructor approval.

CHE 613. ELECTRONIC MATERIALS AND CHARACTERIZATION (3). Physics and chemistry of electronic materials and methods of materials characterization. Offered alternate years. **CROSSLISTED** as ECE 613. **PREREQS:** Graduate standing or instructor approval.

■ ENVIRONMENTAL ENGINEERING COURSES

ENVE 199. SPECIAL TOPICS (1-16). Seminar course that includes invited speakers. Open to all students interested in learning about the Environmental Engineering undergraduate program and potential career opportunities. Graded P/N. This course is repeatable for a maximum of 16 credits.

ENVE 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ENVE 299H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

ENVE 321. ENVIRONMENTAL ENGINEERING FUNDAMENTALS (4). Application of engineering principles to the analysis of environmental problems. Topics include water, wastewater, solid wastes, and air pollution. **PREREQS:** (MTH 256 or MTH 256H)

ENVE 322. FUNDAMENTALS OF ENVIRONMENTAL ENGINEERING (4). Application of engineering principles to the analysis of environmental problems. Topics include water, wastewater, solid wastes, and air pollution. **PREREQS:** ((CH 222 or CH 225H) and (MTH 256 or MTH 256H)) and environmental engineering majors only.

ENVE 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

ENVE 403. THESIS (1-16). **PREREQS:** Departmental approval required.

ENVE 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

ENVE 406. SPECIAL PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

ENVE 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

ENVE 407H. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

ENVE 410. OCCUPATIONAL INTERNSHIP (1-12). This course is repeatable for a maximum of 12 credits.

ENVE 415. ENVIRONMENTAL ENGINEERING LABORATORY (3). Theoretical and empirical analysis of several unit operations, use of formal work processes, safety, teamwork, oral and written communication, and personal accountability. Lec/lab/rec. **PREREQS:** CBEE 414

ENVE 421. WATER AND WASTEWATER CHARACTERIZATION (4). Measurement of physical and chemical characteristics of water and wastewater. Engineering principles for the selection and design of treatment processes. **PREREQS:** (ENVE 321 or ENVE 322)

ENVE 422. ENVIRONMENTAL ENGINEERING DESIGN (4). Design of water and wastewater treatment facilities including physical, chemical, and biological processes. **PREREQS:** ENVE 421

ENVE 425. AIR POLLUTION CONTROL (3). Study of air pollution sources, transport, and control, including engineering, chemical, meteorological, social, and economic aspects. Lec/rec. **PREREQS:** (ENVE 321 or ENVE 322)

ENVE 431. FATE AND TRANSPORT OF CHEMICALS IN ENVIRONMENTAL SYSTEMS (4). Fundamentals of organic chemistry and engineering principles applied to the movement and fate of xenobiotic compounds. Lec/lab/rec. **PREREQS:** ((CH 123 or CH 223 or CH 226H) and (CH 440 or CHE 331) and (ENVE 321 or ENVE 322) and ENVE 421) and .

ENVE 456. SUSTAINABLE WATER RESOURCES DEVELOPMENT (3). Sustainable water resources engineering principles, assessing the impact of engineering practices. Use of engineering analyses and sustainable principles to design projects and minimize their environmental impact.

ENVE 490. ENVIRONMENTAL ENGINEERING DESIGN (4). Open-ended design of environmental processes including development of process flow diagrams, control strategies, process simulators, and financial analysis of processes. **PREREQS:** (ENVE 421 and ENVE 422)

ENVE 499. SPECIAL TOPICS IN ENVIRONMENTAL ENGINEERING (1-4). A critical examination of topics selected by the instructor from among topics not covered in other environmental engineering courses. This course is repeatable for a maximum of 4 credits.

ENVE 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

ENVE 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Graduate standing.

ENVE 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

ENVE 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

ENVE 507. SEMINAR (1-16). One-credit seminar. Graded P/N. This course is repeatable for a maximum of 16 credits.

ENVE 510. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits.

ENVE 521. WATER AND WASTEWATER CHARACTERIZATION (4). Measurement of physical and chemical characteristics of water and wastewater. Engineering principles for the selection and design of treatment processes. **PREREQS:** ENVE 321 or ENVE 322

ENVE 522. ENVIRONMENTAL ENGINEERING DESIGN (4). Design of water and wastewater treatment facilities including physical, chemical, and biological processes. **PREREQS:** ENVE 421

ENVE 525. AIR POLLUTION CONTROL (3). Study of air pollution sources, transport, and control, including engineering, chemical, meteorological, social, and economic aspects. Lec/rec. **PREREQS:** ENVE 321 or ENVE 322

ENVE 531. FATE AND TRANSPORT OF CHEMICALS IN ENVIRONMENTAL SYSTEMS (4). Fundamentals of organic chemistry and engineering principles applied to the movement and fate of xenobiotic compounds. Lec/lab/rec. **PREREQS:** ((CH 123 or CH 223 or CH 226H) and (CH 440 or CHE 331) and (ENVE 321 or ENVE 322) and ENVE 421

ENVE 532. AQUATIC CHEMISTRY: NATURAL AND ENGINEERED SYSTEMS (4). Low temperature thermodynamic and selective kinetic treatments primarily of the inorganic chemistry

groups, but also organic ligands and surface active groups, of natural and engineered waters; thermodynamic principles and computational techniques for prediction of equilibrium speciation; comparison of predictions to observations; computer laboratory. Lec/rec. **CROSSLISTED** as OC 532. **PREREQS:** One year of college-level chemistry (CH 221, CH 222, CH 223 or equivalent), plus a minimum of one year organic or physical chemistry. Recommended corequisites: ENVE 536 Aqueous Environmental Laboratory and/or OC 652 Chemical Oceanography Laboratory.

ENVE 535. PHYSICAL & CHEMICAL PROCESSES FOR HAZARDOUS WASTE TREATMENT (4). Principles and design of unit operations and processes for the treatment of hazardous waste and contaminated soils. **PREREQS:** ENVE 532

ENVE 536. AQUEOUS ENVIRONMENTAL CHEMISTRY LABORATORY (1). Laboratory investigation of acid/base equilibria, coordination chemistry, and precipitation/dissolution chemistry. **COREQS:** ENVE 532

ENVE 541. MICROBIAL PROCESSES IN ENVIRONMENTAL SYSTEMS (4). Energetics kinetics and stoichiometry of microbial transformations of organic and inorganic compounds. Mathematical models of biodegradation.

ENVE 542. MICROBIAL PROCESS DESIGN FOR MUNICIPAL AND HAZARDOUS WASTES (4). Principles and design of microbial processes for treatment of municipal and hazardous wastes. **PREREQS:** ENVE 541

ENVE 554. GROUNDWATER REMEDIATION (4). Theory and practice of groundwater remediation. Environmental site assessments. Physical, chemical, and biological methods for in situ treatment of contaminated aquifers. Modeling of remediation technologies. **PREREQS:** CE 514

ENVE 556. SUSTAINABLE WATER RESOURCES DEVELOPMENT (3). Sustainable water resources engineering principles, assessing the impact of engineering practices. Use of engineering analyses and sustainable principles to design projects and minimize their environmental impact.

ENVE 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ENVE 601. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

ENVE 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** PhD only.

ENVE 699. SELECTED TOPICS IN ENVIRONMENTAL ENGINEERING (1-4). A critical examination of topics selected by the instructors from among topics not covered in other environmental engineering courses. This course is repeatable for a maximum of 8 credits. **PREREQS:** Instructor approval required.

SCHOOL OF CIVIL AND CONSTRUCTION ENGINEERING

Scott Ashford, *School Head*
Chris Bell, *Associate School Head*
Tom Miller, *Assistant School Head, CE*
David Rogge, *Assistant School Head, CEM*
 101 Kearney Hall
 Oregon State University
 Corvallis, OR 97331-3212
 541-737-4934
 Email: cce@engr.orst.edu
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FACULTY

Professors Ashford¹, Bell¹, Cox, Gambatese¹, Higgins¹, Istok¹, Schultz¹, Trejo¹, Yeh¹, Yim¹
Associate Professors Brown¹, Evans, Haller, Hill, Hunter-Zaworski¹, Isgor¹, Lundy¹, Miller¹, Ozkan-Haller, Rogge¹, Scott, Sillars¹
Assistant Professors Babbar-Sebens, Barbosa¹, Borello, Gillins, Hernandez, Hurwitz, Ideker, Lee, Leon, Mason, Olsen, Stuedlein¹, Wang
Adjuncts Gupta, Sinha
Senior Instructor Arras
Instructors Fradella¹, Martin
Academic Advisors Nave-Abele, Lapham
Emeritus Bella¹, Huber¹, Hudspeth¹, Klingeman¹, Layton¹, Pritchett¹, Schroeder¹, Sollitt

¹Licensed Professional Engineer

Undergraduate Majors

Civil Engineering
 (BA, BS, CRED, HBA, HBS)*

Option
Environmental Engineering

Construction Engineering Management
 (BA, BS, CRED, HBA, HBS)

Graduate Major

Civil Engineering (MAIS, MEng, MS, PhD)

Graduate Areas of Concentration
Civil Engineering
Coastal and Ocean Engineering
Construction Engineering Management
Geomatics
Geotechnical Engineering
Infrastructure Materials
Structural Engineering
Transportation Engineering
Water Resources Engineering

Graduate Minor

Civil Engineering

The mission of the School of Civil and Construction Engineering is that of the College of Engineering (see college statement on mission and goals), as well

as providing a comprehensive, state-of-the-art education to prepare students for professional and responsible engineering and constructor positions with business, industry, consulting firms, or government.

Education in the basic sciences occurs primarily in the freshman and sophomore years. Engineering science is introduced at the sophomore year and continues through to graduation with a combination of required courses and technical electives. Completion of the OSU Baccalaureate Core provides experience in the humanities, social sciences, and other nontechnical areas as additional preparation for a student's profession and life.

The CCE School offers an undergraduate option in environmental engineering that provides education in water pollution, air pollution, solid wastes, and hazardous wastes.

The growing complexity of modern engineering practice requires further specialization in one or more engineering disciplines. This is generally attained through postgraduate study. The CCE School offers MEng, MS, and PhD programs with concentrations in civil engineering, coastal and ocean engineering, construction engineering management, geomatics, geotechnical engineering, infrastructure materials, structural engineering, transportation engineering, and water resources engineering.

Areas of concentration may be combined to form an integrated civil engineering MS program, MEng program, or MEng, MS, and PhD minors.

The school also participates in the Master of Arts in Interdisciplinary Studies program.

UNDERGRADUATE MAJORS WITH OPTIONS

CIVIL ENGINEERING (BA, BS, CRED, HBA, HBS)

Tom Miller, *Assistant School Head*
 101 Kearney Hall
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 Corvallis, OR 97331-3212
 541-737-4934
 Email: cce@engr.orst.edu
 Website: <http://cce.oregonstate.edu/>

The Bachelor of Science degree in Civil The Bachelor of Science degree in Civil Engineering is accredited by the Engineering Commission of ABET, <http://www.abet.org>.

Civil engineering is a diverse professional field with discipline specialties in structures, transportation, water supply and water pollution control, geotechnical engineering, hydrology, hydraulics and water resources, geomatics, ocean engineering, construction, and engineering planning and economics. All CE

students receive basic instruction in the various disciplines, with the option for additional elective courses in desired areas. The program is supported by highly qualified faculty and staff that maintain the programs and facilities at the highest level of quality.

The civil engineering curriculum within the School of Civil and Construction Engineering (CCE) includes the basic sciences, social sciences, humanities, communication skills, engineering sciences, and engineering design in order to teach students an integrated approach to practical solutions.

The mission of the civil engineering program is to provide a comprehensive, state-of-the-art education to prepare students for professional and responsible engineering positions with business, industry, consulting firms or government.

Program Educational Objectives—Civil Engineering

Note: The Bachelor of Science degree in Civil Engineering is accredited by the Engineering Accreditation Commission of ABET (<http://www.abet.org>), which requires stated program educational objectives and student outcomes to support these.

OSU Civil Engineering graduates receive a compelling education and are able to demonstrate all of the following within a few years of graduation:

1. Ability to apply the natural sciences; mathematics; engineering sciences; and the fundamental paradigms, concepts, understandings, applications, and knowledge of civil engineering.
2. Ability to analyze, synthesize, and evaluate information; solve engineering problems; and perform modern civil engineering design.
3. Preparation for modern professional practice, including abilities for effective communication, collaborative work in diverse teams, ethical decision-making, successful management of personal and professional career objectives, and continual development through lifelong learning and professional involvement.
4. Preparation for employment or continuation into a graduate program in a specialty area of civil engineering. Recognition of the importance of professional licensure and preparation to achieve this significant accomplishment. Consideration of the public health, welfare and safety to be the paramount priority.
5. Understanding of public policy and contemporary societal issues and sensitivity to the challenge of meeting social, environmental, and economic constraints within a global community.

Student Outcomes for Civil Engineering Programs

The OSU Civil Engineering program prepares its graduates to achieve the Program Educational Objectives above several years into their careers. This is achieved by having students able to perform the following on graduation, well preparing them for active immediate and lifelong service in the profession:

1. Ability to apply knowledge of mathematics, science, and engineering to solve engineering problems
2. Ability to design and conduct experiments as well as analyze and interpret data
3. Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, social, political, ethical, health and safety, manufacturability and sustainability
4. Ability to function on multi-disciplinary teams
5. Ability to identify, formulate, and solve engineering problems
6. Understanding of professional and ethical responsibility
7. Ability to communicate effectively
8. Broad education necessary to understand impact of engineering solutions in global, economic, environmental and societal context
9. Recognition of need for and ability to engage in lifelong learning
10. Knowledge of contemporary issues
11. Ability to use techniques, skills and modern engineering tools necessary for engineering practice
12. Knowledge of basic concepts in leadership
13. Ability to include non-engineering considerations, including business, regulatory and safety issues in problem solving
14. Ability to incorporate effective negotiation or consensus-gaining in group decision making
15. Knowledge and application of project planning and management practices and tools
16. Ability to assess imperfect or incomplete data conditions, risks and alternatives into problem-solving decisions
17. Exposure to current industry design practices, construction methods and materials, and overall project delivery considerations

Design is the essence of civil engineering. Junior and senior level courses include extensive design content, culminating in a team approach to solution of open-ended, realistic problems, including capstone design and professional practice courses. Courses with design content include those with “design” in their titles. A more detailed explanation of

the design experience and design course sequences is contained in the “Civil Engineering Advising Guide,” which may be viewed on the school’s website at <http://cce.oregonstate.edu/academic-advising>.

Pre-Civil Engineering

Freshman Year (45)

- Approved biological science (4)⁵
- CCE 101. Civil and Construction Engineering Orientation (2)⁵
- CCE 102. Civil and Construction Engineering: Problem Solving and Technology (3)^E
- CH 201. Chemistry for Engineering Majors (3)^E
- CH 202. Chemistry for Engineering Majors (3)⁵
- CH 205. Laboratory for Chemistry 202 (1)⁵
- COMM 111. *Public Speaking (3)^{1,E} or COMM 114. *Argument and Critical Discourse (3)^{1,E}
- HHS 231. *Lifetime Fitness for Health (2)¹
- HHS 241–HHS 248. *Lifetime Fitness (various options)(1)¹ or any PAC course (1–2)
- MTH 251. *Differential Calculus (4)^E
- MTH 252. Integral Calculus (4)^E
- MTH 254. Vector Calculus I (4)^E
- PH 211. *General Physics with Calculus (4)^E
- WR 121. *English Composition (3)^{1,E}
- *Perspectives Courses (3)¹

Sophomore Year (46)

- CCE 201. Civil and Construction Engineering Graphics and Design (3)
- CE 202. Civil Engineering: Geospatial Information and GIS (3)
- ECON 201. *Introduction to Microeconomics (4)
- ENGR 211. Statics (3)^E
- ENGR 212. Dynamics (3)⁵
- ENGR 213. Strength of Materials (3)^E
- MTH 256. Applied Differential Equations (4)^E
- MTH 306. Matrix and Power Series Methods (4)^E
- PH 212, PH 213. *General Physics with Calculus (4,4)^E
- ST 314. Introduction to Statistics for Engineers (3)⁵
- WR 327. *Technical Writing (3)¹
- *Perspectives Courses (3)¹

Professional Civil Engineering

Junior Year (48)

- CE 311. Fluid Mechanics (4)
- CE 313. Hydraulic Engineering (4)
- CCE 321. Civil and Construction Engineering Materials (4)
- CE 361. Surveying Theory (4)
- CE 372. Geotechnical Engineering I (4)
- CE 373. Geotechnical Engineering II (4)
- CE 381, CE 382. Structural Theory I, II (4,4)
- CE 383. Design of Steel Structures (4)
- CE 392. Introduction to Highway Engineering (4)
- CE 412. Hydrology (4)
- ENVE 321. Environmental Engineering Fundamentals (4)

Senior Year (41)

- CE 418. ^Civil Engineering Professional Practice (3)
- CE 419. Civil Infrastructure Design (4)

CE 420. Engineering Planning (4)
 CE 481. Reinforced Concrete I (4)
 CE 491. Transportation Engineering (3)
 ENGR 201. Electrical Fundamentals I (3)
 *Perspectives (6)¹
 *Synthesis (6)¹
 Technical Electives (11)

Total=180

Footnotes:

^E Required for entry into the professional program.

¹ Must be selected to satisfy the requirements of the baccalaureate core.

⁵ Prerequisite for several upper-division courses. Recommended for completion prior to entry into the professional program.

CIVIL ENGINEERING-FOREST ENGINEERING

A five-year dual-degree program in civil engineering and forest engineering is offered jointly by the School of Civil and Construction Engineering in the College of Engineering and Forest Engineering in the College of Forestry. Advising is done through either academic unit. See Forest Engineering, Resources and Management in the College of Forestry.

GEOMATICS (SURVEYING AND MAPPING)

Graduates of civil engineering are eligible to take the Fundamentals of Land Surveying Examination in pursuit of the Professional Land Surveying license by selecting courses as follows.

CE 361. Surveying Theory (4)

Plus 12 credits from the following:

CE 365. Highway Location and Design (3)
 CE 461/CE 561. Photogrammetry (3)
 CE 463/CE 563. Control Surveying (4)
 CE 465/CE 565. Oregon Land Survey Law (3)
 CE 469/CE 569. Property Surveys (3)
 CE 562. Digital Terrain Modeling (4)

OPTIONS

ENVIRONMENTAL ENGINEERING OPTION

CCE students may elect a transcript-visible Environmental Engineering option. A minimum of 21 credits is required.

Core Courses (21)

CH 123. *General Chemistry (5)
 or CH 223. *General Chemistry (5)
 CE 407. Seminar: Water Resource Issues (1)
 ENVE 421. Water and Wastewater Characterization (4)
 ENVE 422. Environmental Engineering Design (4)
 ENVE 431. Fate and Transport of Chemicals in Environmental Systems (4)
 ENVE 456. Sustainable Water Resources Development (3)

CONSTRUCTION ENGINEERING MANAGEMENT (BA, BS, CRED, HBA, HBS)

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Email: cce@engr.orst.edu

Website: <http://cce.oregonstate.edu/>

The School of Civil and Construction Engineering offers BA and BS degrees in Construction Engineering Management (CEM). This unique program blends principles of basic science, engineering, and technology with a strong component of business subjects to prepare graduates for a productive career in the construction industry. The BS in Construction Engineering Management is ACCE accredited.

The CEM program is built on a rigorous four-year curriculum that emphasizes practical applications as well as basic principles. Students are given hands-on experiences in the laboratory and are involved in field trips as a supplement to their classroom activities. A more detailed explanation of the CEM Program is contained in the "Construction Engineering Management Advising Guide," which may be viewed on the school's website at <http://cce.oregonstate.edu/academic-advising>.

The mission of the CEM program is to provide a comprehensive, state-of-the-art education to prepare students for professional and responsible constructor positions with business, industry, consulting firms or government. The program's educational objectives are to:

1. Provide a compelling education based in the natural sciences, mathematics, engineering sciences, and business, and in the fundamental paradigms, concepts, understandings, applications, and knowledge of civil and construction engineering and construction management.
2. Develop students' abilities through their education to analyze, synthesize, and evaluate information, solve engineering problems, and be prepared to effectively perform project engineering and management tasks for effective execution of construction projects.
3. Provide education for modern professional practice including the abilities for effective communication, collaborative work in diverse teams, ethical decision-making, successful management of personal and professional career objectives, and continual development through lifelong learning and professional involvement.
4. Prepare our graduates for either immediate employment or for graduate school opportunities in construction or business.

5. Provide students with knowledge of contemporary societal issues and a sensitivity to the challenge of meeting social, environmental, and economic constraints within a global community.

Construction Engineering Management (BA, BS, HBA, HBS)

Pre-Construction Engineering Management

Freshman Year (46)

CCE 101. Civil and Construction Engineering Orientation (2)⁵
 CCE 102. Civil and Construction Engineering: Problem Solving and Technology (3)^E
 CH 201. Chemistry for Engineering Majors (3)⁵
 COMM 111. *Public Speaking (3)¹
 or COMM 114. *Argument and Critical Discourse (3)¹
 ECON 201. *Introduction to Microeconomics (4)¹
 HHS 231. *Lifetime Fitness for Health (2)¹
 HHS 241–HHS 248. *Lifetime Fitness (various activities) (1)¹
 or any PAC course (1–2)
 MTH 251. *Differential Calculus (4)^E
 MTH 252. Integral Calculus (4)^E
 PH 211. *General Physics with Calculus (4)^E
 PHL 205. *Ethics (4)¹
 WR 121. *English Composition (3)^{1,E}
 Approved Biological Science Course (4)⁵
 Free Electives (2)
 *Perspectives Course (3)¹

Sophomore Year (43)

BA 215. Fundamentals of Accounting (4)^E
 BA 230. Business Law I (4)
 CCE 201. Civil and Construction Engineering Graphics and Design (3)^{1,E}
 CCE 203. Introduction to Virtual Design and Construction (3)
 CEM 263. Plane Surveying (3)⁵
 ECON 202. *Introduction to Macroeconomics (4)¹
 ENGR 211. Statics (3)^E
 ENGR 213. Strength of Materials (3)^E
 ENGR 390. Engineering Economy (3)^E
 PH 212. *General Physics with Calculus (4)^E
 ST 314. Introduction to Statistics for Engineers (3)^E
 WR 327. *Technical Writing (3)¹
 *Perspectives Course (3)¹

Professional Construction Engineering Management

Junior Year (46)

CCE 321. Civil and Construction Engineering Materials (4)
 CE 365. Highway Location and Design (3)
 CE 424. Contracts and Specifications (4)
 CEM 311. Hydraulics (4)
 CEM 341. Construction Estimating I (4)
 CEM 381. Structures I (4)
 CEM 407. Seminar (1)
 CEM 441. Heavy Civil Construction Management (4)
 CEM 442. Building Construction Management (4)
 CEM 471. Electrical Facilities (4)
 CEM 472. Mechanical Facilities (3)

FE 315. Soil Engineering (4)
or CE 372. Geotechnical Engineering I (4)
*Difference, Power, and Discrimination
Course (3)¹

Senior Year (45)

BA 351. Managing Organizations (4)
MGMT 453. Human Resources Management
(4)
CE 427. Temporary Construction Structures
(4)
CEM 342. Construction Estimating II (4)
CEM 343. Construction Planning and
Scheduling (4)
CEM 383. Structures II (4)
CEM 407. Seminar (1)
CEM 443. ^Project Management for
Construction (4)
H 385. Safety and Health Standards and
Laws (3)
Required COMM Elective (3)
Restricted Upper-Division Business Elective
(4)
*Synthesis Course (6)¹

Degree total=180

Footnotes:

- * Baccalaureate Core Course
- ^ Writing Intensive Course (WIC)
- ^E Required for entry into the professional program.
- ¹ Must be selected to satisfy baccalaureate core requirements.
- ⁵ Prerequisite for several upper-division courses. Recommended for completion prior to entry into the professional program.

GEOMATICS (SURVEYING AND MAPPING)

Construction engineering management graduates are eligible to take the Fundamentals of Land Surveying Examination by completing:

CE 365. Highway Location and Design (3)
CEM 263. Plane Surveying (3)

Plus 10 credits from the following:

CE 461/CE 561. Photogrammetry (3)
CE 463/CE 563. Control Surveying (4)
CE 465/CE 565. Oregon Land Survey Law
(3)
CE 469/CE 569. Property Surveys (3)
CE 562. Digital Terrain Modeling (4)

GRADUATE MAJORS

CIVIL ENGINEERING (MEng, MS, PhD, MAIS)

Graduate Areas of Concentration
Civil engineering, coastal and ocean engineering, construction engineering management, geomatics, geotechnical engineering, infrastructure materials, structural engineering, transportation engineering, and water resources engineering

The School of Civil and Construction Engineering offers graduate work leading to the Master of Engineering, Master of Science, and Doctor of Philosophy degrees. The MEng, MS, and PhD degrees offer concentrations in civil engineering, coastal and ocean engineering,

construction engineering and management, geomatics, geotechnical engineering, infrastructure materials, structural engineering, transportation engineering, water resources engineering, and interdisciplinary areas. Areas of concentration can also be combined to form an integrated civil engineering MS program or MS and PhD minors. The MEng is a course work-only degree requiring a final oral exam. For the MS degree, a thesis or project is required. The PhD degree requires a dissertation.

Degree programs prepare the student for advanced-level entry into professional engineering practice and for careers in research and teaching. Majors within the department constitute approximately two-thirds of the total program. Minor fields may be selected from departmental offerings in different subject areas, from other engineering disciplines, or from other fields of study that support the major. The school also participates in the Master of Arts in Interdisciplinary Studies program.

CIVIL ENGINEERING GRADUATE MINOR

For more details, see the school advisor.

■ CIVIL AND CONSTRUCTION ENGINEERING COURSES

CCE 101. CIVIL AND CONSTRUCTION ENGINEERING ORIENTATION (2). Introduction to civil and construction engineering professions; problem solving, communication skills. This course is required by the CE, CEM and FE programs. **PREREQS:** (MTH 112* or MTH 251*) and MTH 111

CCE 102. CIVIL & CONSTRUCTION ENGR: PROBLEM-SOLVING AND TECHNOLOGY (3). A skills-based course that focuses on introducing freshman students to the use of technology in solving civil engineering problems. Topics to be covered include units, homework professionalism, professional presentations, Internet tools, software for numeric methods and programming. Students use laptop computers during class. Some class involvement with professional societies or chapters. Projects from the areas of civil and construction engineering. Lec/lab. **PREREQS:** (MTH 112* or MTH 251*) and MTH 111

CCE 201. CIVIL AND CONSTRUCTION ENGINEERING GRAPHICS AND DESIGN (3). Introduces the engineering design process and graphic skills that are used by civil and construction engineers. Topics include design process, geometric construction, multiviews, auxiliary views, sections, dimensioning, tolerances and engineering drawing standards. Students participate in team design projects and presentations. Graphic and design projects from the areas of civil and construction engineering. Lec/lab. **PREREQS:** (MTH 111 or MTH 112* or MTH 241* or MTH 251*)

CCE 203. INTRODUCTION TO VIRTUAL DESIGN AND CONSTRUCTION (3). Basic principles of virtual design and construction (VDC) focusing on skills required for generating design and construction information models. Parametric modeling and design constraints are introduced. Students will utilize construction drawings and documentation to create accurate 3D models. Use of design and construction information models for making estimates of quantities and cost, and for determination of constructability problems. Lec/lab. **PREREQS:** CCE 201

CCE 321. CIVIL AND CONSTRUCTION ENGINEERING MATERIALS (4). Highway materials; aggregate, concrete and asphalt. Standard test methods. **PREREQS:** ((ENGR 213 or ENGR 213H) and (ST 314 or BA 276))

CCE 421. ADVANCED CONCRETE PROPERTIES AND PERFORMANCE (4). Cement production, hydration, supplementary cementitious materials, mixture design and proportioning, heat of hydration, volume stability, shrinkage, cracking, expansion, creep, relaxation, admixtures, alternative binders, strength gain, durability. **PREREQS:** CCE 321 and senior standing.

CCE 422. GREEN BUILDING MATERIALS (3). Introduces concepts of construction with green building materials. Specific concepts include evaluation of what truly makes a material "green", long-term performance (e.g. durability) of materials, material production and life cycle cost analysis. Concepts of green building programs, guidelines and specifications will be introduced. **PREREQS:** (CE 321 or CCE 321) and (ECON 201 or ECON 201H or ECON 202 or ECON 202H) and ST 314 or equivalent.

CCE 520. SELECTED TOPICS IN INFRASTRUCTURE MATERIALS (1-4). A critical examination of in-depth topics selected by the instructor from among topics not covered in other infrastructure materials courses. This course is repeatable for a maximum of 16 credits. **PREREQS:** Depending on the selected topic covered there may be prerequisites such as "graduate standing" or "undergraduate materials course such as CCE 321"

CCE 522. GREEN BUILDING MATERIALS (3). Introduces concepts of construction with green building materials. Specific concepts include evaluation of what truly makes a material "green", long-term performance (e.g. durability) of materials, material production and life cycle cost analysis. Concepts of green building programs, guidelines and specifications will be introduced. **PREREQS:** (CE 321 or CCE 321) and (ECON 201 or ECON 201H or ECON 202 or ECON 202H) and ST 314 or equivalent.

CCE 523. CONCRETE DURABILITY (4). Cement production, supplementary cementitious materials, mixture proportioning, concrete durability, freeze-thaw attack, sulfate attack, corrosion, alkali-silica reaction, long-term performance, durability prediction and modeling, durability of alternative cement, multi-scale assessment, dimensional stability. **PREREQS:** CCE 321, Civil and Construction Engineering Materials or similar introductory materials course or CCE 421, Advanced Concrete Properties and Performance.

CCE 525. CONSTRUCTION SITE SYSTEMS ENGINEERING (3). Design and planning of construction site field operations and engineered systems. Systems analysis and design as it applies to civil engineering projects. Design of construction systems: blasting; rock crushing and conveying; dewatering; cranes, pile driving, and rigging; and concrete pumping and placement. Construction site design and process design. **PREREQS:** Graduate standing or consent of instructor.

■ CIVIL ENGINEERING COURSES

CE 199. SPECIAL TOPICS (1-4).

CE 202. CIVIL ENGINEERING: GEOSPATIAL INFORMATION AND GIS (3). Introductory design principles presented with the use of GIS and geospatial information (remote sensing, GPS, surveying, and aerial photography) for civil engineering problem solving. Introduction to the integration of geospatial data and analysis for decision making and management for site selection, mitigation, change analysis, modeling and assessment. Standard software and custom programming used in course. Students participate in both individual and team projects

and presentations. Projects from the area of civil engineering. Lec/lab. **PREREQS:** (CE 201 or CCE 201 or ENGR 248)

CE 299. SPECIAL TOPICS (1-4). Graded P/N.

CE 299H. SPECIAL TOPICS (1-4). Graded P/N. **PREREQS:** Honors College approval required.

CE 311. FLUID MECHANICS (4). Fluid properties, fluid statics, fluid motion, conservation of mass, momentum and energy for incompressible fluids, dimensional analysis, civil engineering applications.

CE 313. HYDRAULIC ENGINEERING (4). Analysis of large civil engineering fluid systems including conduit flow, multiple reservoirs, pipe networks, pumps, turbines, open channel flow, and hydraulic structures. **PREREQS:** (CE 311 or CHE 331)

CE 361. SURVEYING THEORY (4). Use of surveying equipment, Gaussian error theory applied to measurements, calculations of position on spherical and plane surfaces, state plane coordinate systems, introduction to global positioning systems.

CE 365. HIGHWAY LOCATION AND DESIGN (3). Curve problems in highway design, including circular, vertical, compound curves and spirals; earth distribution analysis; preliminary office studies; paper location procedures and field layout problems. **PREREQS:** (CE 361 or CEM 263 or FE 308)

CE 372. GEOTECHNICAL ENGINEERING I (4). Basic soil mechanics including the identification and classification of soil, principles of compaction and consolidation, flow through porous media, effective stress, and shear strength. Lec/lab. **PREREQS:** (ENGR 213 and (CE 311* or CEM 311* or CHE 331*))

CE 373. GEOTECHNICAL ENGINEERING II (4). Application of fundamental soil mechanics principles to analyses of slope stability, retaining structures, and foundation support. Lec/rec. **PREREQS:** (CE 372 or FE 315)

CE 381. STRUCTURAL THEORY I (4). Analysis of statically determinate structures (beams, frames, trusses, arches, and cables). Approximate analysis, influence lines, deflections. **PREREQS:** (ENGR 213 or ENGR 213H)

CE 382. STRUCTURAL THEORY II (4). Analysis of statically determinate structures (beams, frames, trusses). Deflections. Energy methods, introduction to matrix methods. **PREREQS:** CE 381

CE 383. DESIGN OF STEEL STRUCTURES (4). Introduction to design of steel members, connections and structural systems. Lec/lab. **PREREQS:** CE 382

CE 392. INTRODUCTION TO HIGHWAY ENGINEERING (4). Highway engineering standards, geometric design, cross section and roadside design, highway surfaces, pavement design, highways and the environment, highway construction and maintenance. **PREREQS:** ((ENGR 212 or ENGR 212H) and CE 361)

CE 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

CE 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

CE 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

CE 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

CE 407. SEMINAR (1-3). Understanding complexity and systems thinking. This course is repeatable for a maximum of 16 credits.

CE 407H. SEMINAR (1-3). Understanding complexity and systems thinking. This course is repeatable for a maximum of 16 credits.

PREREQS: Honors College approval required.

CE 408. WORKSHOP (1-3).

CE 410. INTERNSHIP (1-12). This course is repeatable for a maximum of 16 credits.

CE 411. OCEAN ENGINEERING (4). Introduction to linear wave theory and wave forces on piles. Guided design of wave gauge facility at Coos Bay, Oregon, that requires synthesizing fluid mechanics, structural design and foundation design. **PREREQS:** CE 313 or CEM 311

CE 412. HYDROLOGY (4). Fundamentals of hydrology, the hydrologic cycle, precipitation, streamflow, hydrograph analysis and hydrologic measurements.

CE 413. GIS IN WATER RESOURCES (3). Course presents Geographic Information System (GIS) technology for developing solutions to water resource problems: water quality, availability, flooding, the natural environment, and management of water resources. Typical GIS data models for hydrologic information are presented. Synthesis of geospatial and temporal water resources to support hydrologic analysis and modeling are covered. **PREREQS:** Senior or graduate standing in engineering or a previous introductory GIS course.

CE 415. COASTAL INFRASTRUCTURE (3). Planning and design criteria of coastal infrastructure, including breakwaters, jetties, sea walls, groins, piers, submerged pipelines, harbor design, and tsunami defense. Use of laboratory models, numerical simulations, and field observations for design. **PREREQS:** CE 313

CE 417. HYDRAULIC ENGINEERING DESIGN (4). Theory, planning, analysis, and design of hydraulic structures. Application of basic principles detailed analysis and design. Engineering planning and design of water resource systems. **PREREQS:** CE 313

CE 418. CIVIL ENGINEERING PROFESSIONAL PRACTICE (3). Engineering career paths; ethics and professionalism, project planning, execution and delivery; team building/management; marketing proposals; engineering overseas; dispute resolution; partnering; effective decision making; uncertainty and risk analysis; and current industry design and construction methods. (Writing Intensive Course) **PREREQS:** Civil and environmental engineering majors within three terms of graduation.

CE 419. CIVIL INFRASTRUCTURE DESIGN (4). A capstone design project experience exposing students to problems and issues similar to those encountered in the practice of civil engineering. Students should have completed ALL other required courses in their degree program prior to registering for this course. Lec/lab/rec. **PREREQS:** CE 418

CE 420. ENGINEERING PLANNING (4). The application of systems analysis to structuring, analyzing, and planning for civil engineering projects. Concept of the system and its environment; setting goals, objectives, and standards; evaluation criteria; solution generation and analysis; evaluation and optimization. Project management using precedence node diagramming; resource allocation and leveling; time-cost trade-off; and PERT.

CE 424. CONTRACTS AND SPECIFICATIONS (4). Fundamentals of construction industry contracts, including technical specifications, and issues related to time, money, warranty, insurance, and changed conditions.

CE 427. TEMPORARY CONSTRUCTION STRUCTURES (4). Design and construction of temporary structures including formwork, shoring, and earth retaining structures. **PREREQS:** ((CE 321 or CCE 321) and (FE 315 or CE 372) and (CEM 383 or CE 383))

CE 428. PROJECT MANAGEMENT FOR CIVIL ENGINEERS (4). Provides the prospective civil engineer with the technical knowledge and familiarity necessary to successfully and confidently manage projects of different sizes and complexity levels. It relies on basic knowledge and techniques developed by the Project Management Institute (PMI) and real-world examples (through lectures, example projects, case studies, and guest speakers) from the public and private sectors.

CE 461. PHOTOGRAMMETRY (3). Geometry of terrestrial and vertical photographs, flightline planning, stereoscopy and parallax, stereoscopic plotting instruments, analytical photogrammetry, orthophotography, introduction to photo interpretation, and aerial cameras. **PREREQS:** (CE 361 or CEM 263 or FE 308)

CE 463. CONTROL SURVEYING (4). Global Positioning Systems (GPS) theory, networks, and fieldwork; control specifications, methods and problems in obtaining large area measurements; precise leveling; network adjustments using least square techniques; field instrument adjustments. **PREREQS:** (CE 361 or CEM 263 or FE 308)

CE 465. OREGON LAND SURVEY LAW (3). Introduction to U.S. public land survey; Oregon state statutes, common law decisions, and administrative rules dealing with boundary law; case studies; unwritten land transfers; original and resurvey platting laws; guarantees of title; deed descriptions. **PREREQS:** (CE 361 or CEM 263 or FE 308)

CE 469. PROPERTY SURVEYS (3). U.S. public land survey: restoration of corners, subdivision of sections; topographic mapping; subdivision and partition plats, resurvey plats, subdivision design; introduction to LIS/GIS; field astronomy. **PREREQS:** (CE 361 or CEM 263 or FE 308)

CE 471. FOUNDATIONS FOR STRUCTURES (4). Criteria, theory, and practice of design and construction for foundations of structures; staged embankment construction and design of preload fills; case history analysis; use of in situ tests for geotechnical engineering. **PREREQS:** CE 373

CE 481. REINFORCED CONCRETE I (4). Basic principles of reinforced concrete design; strength, stability, and serviceability criteria; design of reinforced concrete members for flexure and shear. Detailing, development length and splices. **PREREQS:** CE 382 and /or equivalent.

CE 482. MASONRY DESIGN (3). A critical examination in depth of masonry design topics. **PREREQS:** CE 481 and /or equivalent.

CE 484. WOOD DESIGN (4). Study of basic wood properties and design considerations. Design and behavior of wood connectors, beams, columns and beam columns. Introduction to plywood and glued laminated members. Analysis and design of structural diaphragms and shear walls. Lec/lab. **CROSSLISTED** as WSE 458. **PREREQS:** CE 383 or CE 481 and senior or graduate standing.

CE 486. PRESTRESSED CONCRETE (3). Prestressed concrete analysis and design, systems of prestressing, materials, economics. **PREREQS:** CE 481

CE 491. TRANSPORTATION ENGINEERING (3). Introduction to transportation engineering systems characteristics, traffic estimation, comprehensive transportation planning, highway economics, driver and vehicle characteristics, highway operations and capacity, signalization and control. Introduction to intelligent transportation. **PREREQS:** (CE 392 and ST 314)

CE 492. PAVEMENT STRUCTURES (3). Design and rehabilitation of pavement structures for streets, highways, and airports. **PREREQS:** CE 392

CE 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

CE 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

CE 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

CE 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

CE 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

CE 508. WORKSHOP (1-3). Graded P/N.

CE 510. INTERNSHIP (1-12). This course is repeatable for a maximum of 16 credits.

CE 511. OCEAN ENGINEERING (4). Introduction to linear wave theory and wave forces on piles. Guided design of wave gauge facility at Coos Bay, Oregon, that requires synthesizing fluid mechanics, structural design and foundation design. **PREREQS:** CE 313 or CEM 311

CE 512. HYDROLOGY (4). Fundamentals of hydrology, the hydrologic cycle, precipitation, streamflow, hydrograph analysis and hydrologic measurements.

CE 513. GIS IN WATER RESOURCES (3). Course presents Geographic Information System (GIS) technology for developing solutions to water resource problems: water quality, availability, flooding, the natural environment, and management of water resources. Typical GIS data models for hydrologic information are presented. Synthesis of geospatial and temporal water resources to support hydrologic analysis and modeling are covered. **PREREQS:** Senior or graduate standing in engineering or a previous introductory GIS course.

CE 514. GROUNDWATER HYDRAULICS (3). Principles of groundwater flow and chemical transport in confined and unconfined aquifers, aquifer testing and well construction. Design of dewatering and contaminant recovery systems. **CROSSLISTED** as BEE 514 and GEO 514. **PREREQS:** MTH 252

CE 515. COASTAL INFRASTRUCTURE (3). Planning and design criteria of coastal infrastructure, including breakwaters, jetties, sea walls, groins, piers, submerged pipelines, harbor design, and tsunami defense. Use of laboratory models, numerical simulations, and field observations for design. **PREREQS:** CE 313

CE 517. HYDRAULIC ENGINEERING DESIGN (4). Theory, planning, analysis, and design of hydraulic structures. Application of basic principles detailed analysis and design. Engineering planning and design of water resource systems. **PREREQS:** CE 313

CE 518. GROUNDWATER MODELING (4). Application of numerical methods to the solution of water flow and solute transport through saturated and unsaturated porous media. Analysis of confined and unconfined aquifers. Computer solution of large-scale field problems including groundwater contamination and aquifer yield. **PREREQS:** CE 514

CE 520. ENGINEERING PLANNING (4). The application of systems analysis to structuring, analyzing, and planning for civil engineering projects. Concept of the system and its environment; setting goals, objectives, and standards; evaluation criteria; solution generation and analysis; and evaluation and optimization. Project management using precedence node diagramming; resource allocation and leveling; time-cost trade-off; and PERT.

CE 524. CONTRACTS AND SPECIFICATIONS (4). Fundamentals of construction industry contracts, including technical specifications, and issues related to time, money, warranty, insurance, and changed conditions.

CE 526. ADVANCED CONCRETE MATERIALS (3). Cement hydration, supplementary cementing materials, micro to macro scale property development, mixture design and proportioning including material selection for sustainable design

practices, durability aspects including freeze-thaw attack, corrosion of reinforcing steel, sulfate attack and alkali-silica reaction, recent advances in concrete technology. **PREREQS:** (CE 321 or CCE 321) or equivalent.

CE 527. TEMPORARY CONSTRUCTION STRUCTURES (4). Design and construction of temporary structures including formwork, shoring, and earth retaining structures. **PREREQS:** (CE 321 or CCE 321) and (FE 315 or CE 372) and (CEM 383 or CE 383)

CE 528. PROJECT MANAGEMENT FOR CIVIL ENGINEERS (4). Provides the prospective civil engineer with the technical knowledge and familiarity necessary to successfully and confidently manage projects of different sizes and complexity levels. It relies on basic knowledge and techniques developed by the Project Management Institute (PMI) and real-world examples (through lectures, example projects, case studies, and guest speakers) from the public and private sectors.

CE 530. SELECTED TOPICS IN STRUCTURAL ANALYSIS AND MECHANICS (3). A critical, in-depth examination of topics selected by the instructor from among topics not covered in other structural analysis and mechanics courses. This course is repeatable for a maximum of 9 credits. **PREREQS:** CE 585

CE 531. STRUCTURAL MECHANICS (3). Theories of failure, multi-axial stress conditions, torsion, shear distortions, energy methods of analysis, beams on elastic foundations. Nonlinear and inelastic behavior. **PREREQS:** Graduate standing.

CE 532. FINITE ELEMENT ANALYSIS (4). Applications of the finite element method to structural analysis, fluid flow and elasticity problems. Use and development of large finite element computer programs. **PREREQS:** (CE 585 or ME 520) and /or equivalent.

CE 533. STRUCTURAL STABILITY (3). Stability theory and applications, with emphasis on design of steel structures. **PREREQS:** CE 383 or equivalent.

CE 534. STRUCTURAL DYNAMICS (4). Analytical and numerical solutions for single, multi-degree of freedom and continuous vibrating systems. Behavior of structures, dynamic forces and support motions. Seismic response spectra analysis. **PREREQS:** CE 382 or equivalent.

CE 535. INTRODUCTION TO RANDOM VIBRATIONS (4). Introduction to probability theory and stochastic processes. Correlation and spectral density functions. Response of linear systems to random excitations. First excursion and fatigue failures. Applications in structural and mechanical system analysis and design. **PREREQS:** CE 534 or (ME 422 or ME 522) and CE 534 or ME 422 or ME 522 or equivalent.

CE 537. NONLINEAR STRUCTURAL ANALYSIS (4). Material and geometric nonlinear analysis of frame and truss structures. Solution strategies for nonlinear structural analysis. Nonlinear constitutive models of steel and reinforced concrete members. Development and use of computer programs for nonlinear analysis. **PREREQS:** CE 585

CE 540. SPECIAL TOPICS IN HYDRAULIC ENGINEERING (3-4). This course is repeatable for a maximum of 16 credits.

CE 543. APPLIED HYDROLOGY (4). Advanced treatment of hydrology covering major components of the hydrological cycle with special emphasis on surface water; hydrologic analysis and design of water resource systems; runoff prediction; and simulation of surface water systems. Offered alternate years. **PREREQS:** BEE 512 and CE 412 or equivalent.

CE 544. OPEN CHANNEL FLOW (3). Steady, uniform, and nonuniform flow in natural and artificial open channels; unsteady flow; interaction of flow with river structures; and computational

methods. **PREREQS:** (CE 311 and CE 313) or CE 547 or equivalent.

CE 547. WATER RESOURCES ENGINEERING I: PRINCIPLES OF FLUID MECHANICS (4). Fluid mechanics for water resources engineers, classifications of fluid flows; fluid statics and dynamics, incompressible viscous flows; dimensional analysis; applications to fluid machinery, flow through porous media, fluid motion in rivers, lakes, oceans. **PREREQS:** Graduate standing.

CE 548. WATER QUALITY DYNAMICS (3). Mass balance, advection and diffusion in streams, lakes and estuaries; thermal pollution, heat balance, oxygen balance, and eutrophication; mathematical models; and numerical solutions.

CE 551. COMPUTER-AIDED SITE AND ROAD DESIGN (4). Site development and road design principles and application to a comprehensive design project using computer-based digital terrain model software tools. Lec/lab/rec. **PREREQS:** CE 392*

CE 552. ISOLATED SIGNALIZED INTERSECTIONS (3). Relationships between signal display, user response, vehicle detection, and signal timing parameters are examined in detail. Traffic simulation is introduced to visualize and design the various elements of isolated signalized intersections. **PREREQS:** CE 595, Traffic Operations and Design, is recommended but not required.

CE 561. PHOTOGRAMMETRY (3). Geometry of terrestrial and vertical photographs, flightline planning, stereoscopy and parallax, stereoscopic plotting instruments, analytical photogrammetry, orthophotography, introduction to photo interpretation, and aerial cameras. **PREREQS:** CE 361 or CEM 263 or FE 308

CE 562. DIGITAL TERRAIN MODELING (4). Fundamentals of LIDAR and creating digital terrain models. Computational geometry, Delaunay triangulations, spline interpolations, statistical gridding methods, ground filtering, data optimizations, and advanced topics in 3D modeling. **PREREQS:** CE 361 or CEM 263 or equivalent surveying or GIS course.

CE 563. CONTROL SURVEYING (4). Global Positioning Systems (GPS) theory, networks, and fieldwork; control specifications, methods and problems in obtaining large area measurements; precise leveling; network adjustments using least square techniques; field instrument adjustments. **PREREQS:** CE 361 or CEM 263 or FE 308

CE 565. OREGON LAND SURVEY LAW (3). Introduction to U.S. public land survey; Oregon state statutes, common law decisions, and administrative rules dealing with boundary law; case studies; unwritten land transfers; original and resurvey platting laws; guarantees of title; deed descriptions. **PREREQS:** CE 361 or CEM 263 or FE 308

CE 569. PROPERTY SURVEYS (3). U.S. public land survey: restoration of corners, subdivision of sections; topographic mapping; subdivision and partition plats, resurvey plats, subdivision design; introduction to LIS/GIS; field astronomy. **PREREQS:** CE 361 and CEM 263 or FE 308

CE 570. GEOTECHNICAL SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

CE 571. ADVANCED FOUNDATION ENGINEERING (4). Presents the planning, analysis, and design of shallow and deep foundations. Topics supporting course objectives include aspects of subsurface investigations, in-situ testing, factors of safety, margin of safety, reliability, and Load and Resistance Factor Design. Advances in foundation engineering practice in the Pacific Northwest are discussed. **PREREQS:** CE 373 and CE 471 or equivalent, or consent of instructor.

CE 572. ADVANCED GEOTECHNICAL LABORATORY (4). Examination of soil composition and engineering properties of soils including volume change, pore pressure generation, strength, and deformation behavior of soils in the laboratory. Advanced static and cyclic shear strength testing of soils will also be discussed. Lec/lab. **PREREQS:** (CE 373 and CE 471) or equivalent, or consent of instructor.

CE 573. SEEPAGE AND CONSOLIDATION (4). The fundamentals of effective stress, capillarity, theory of fluid flow in porous media, isotropic and anisotropic seepage analysis, the theory of consolidation, and advanced consolidation settlement analyses are presented. Advanced numerical techniques are implemented for the solution to complex seepage and consolidation problems. **PREREQS:** CE 372 and CE 471

CE 574. ENGINEERING PROPERTIES OF SOILS (5). Advanced laboratory experimental methods for measurement of soil properties. Analysis of experimental data, and methods to display data for 2D and 3D experiments. Compositional and environmental factors affecting the stress-strain, volume change, compressibility, shear strength behavior of sand, clay, and compacted soils in 2D and 3D. Stress and strain invariants and modeling of failure criteria. **PREREQS:** CE 471

CE 575. EARTH RETENTION AND SUPPORT (4). Practical application of earth pressure theories to retaining walls, bulkheads, culverts, and braced excavations. Use of geosynthetics for earth retention. **PREREQS:** CE 373

CE 576. SOIL AND SITE IMPROVEMENT (3). The application of soil reinforcement and treatment methods for improving the performance of soils in foundations, earth retention, and drainage systems. Classification of geosynthetics, functions, properties and tests, as well as ground treatment methods for improving the strength and volume change behavior of soils in situ. **PREREQS:** CE 373 or FE 316

CE 577. SHEAR STRENGTH AND SLOPE STABILITY (4). An introduction to the analysis of generalized stress states and theoretical failure theories for soils, soil behavior in drained and undrained shear, stress paths to failure, total and effective stress analysis, and critical state soil mechanics. Shear strength concepts are applied to the stability of natural and man-made slopes, using simplified and advanced numerical solutions. **PREREQS:** CE 373 and CE 417 or equivalent or consent of instructor.

CE 578. GEOTECHNICAL EARTHQUAKE ENGINEERING (4). A practice-oriented overview and treatment of the major areas involved in the geotechnical aspects of earthquake engineering. In addition to the introduction and application of conventional engineering analysis and design methods, the course will also include discussion of ongoing developments, current areas of debate, evolving seismic codes and current standards of practice, and the current state of knowledge regarding seismic hazards in the Pacific Northwest. **PREREQS:** CE 373 and CE 471 or equivalent, or consent of the instructor.

CE 580. SELECTED TOPICS IN STRUCTURAL DESIGN (3). A critical examination in depth of topics selected by the instructor from among topics not covered in other structural design courses. This course is repeatable for a maximum of 18 credits.

CE 581. REINFORCED CONCRETE I (4). Basic principles of reinforced concrete design; strength, stability, and serviceability criteria; design of reinforced concrete members for flexure and shear. Detailing, development length and splices. **PREREQS:** CE 382 or equivalent.

CE 582. MASONRY DESIGN (3). A critical examination in depth of topics selected by the instructor from among topics not covered in other structural design courses. **PREREQS:** CE 581 or equivalent.

CE 583. BRIDGE DESIGN (3). AASHTO specifications for bridge design; load models; design for moving loads; design and analysis of bridge decks and simple and continuous bridge spans. **PREREQS:** CE 381 and CE 382 and (CE 481 or CE 581). It's recommended that students take CE 383 concurrently with CE 583.

CE 584. WOOD DESIGN (4). Study of basic wood properties and design considerations. Design and behavior of wood connectors, beams, columns and beam columns. Introduction to plywood and glued laminated members. Analysis and design of structural diaphragms and shear walls. Lec/lab. **CROSSLISTED** as WSE 558. **PREREQS:** CE 383 or CE 481 with a minimum grade of C, senior or graduate standing.

CE 585. MATRIX STRUCTURAL ANALYSIS (4). Development of matrix methods for linear structural analysis. Force and displacement methods of analysis. Virtual work principles. Use of computer programs to analyze structures. Introduction to finite-element method. **PREREQS:** CE 382 or equivalent.

CE 586. PRESTRESSED CONCRETE (3). Prestressed concrete analysis and design, systems of prestressing, materials, economics. **PREREQS:** CE 581

CE 588. PROBABILITY-BASED ANALYSIS AND DESIGN (4). Application of probability and statistics in the analysis and design of civil and mechanical engineering systems. Probabilistic modeling of loading and resistance. Probability-based design criteria including load and resistance factor design. **PREREQS:** ST 314 or equivalent.

CE 589. SEISMIC DESIGN (4). Design of structures to resist the effects of earthquakes. Introduction to structural dynamics, dynamic analysis, seismic design philosophy, code requirements, and detailing for steel and reinforced concrete. **PREREQS:** CE 383 or CE 481 or equivalent.

CE 590. SELECTED TOPICS IN TRANSPORTATION ENGINEERING (1-3). Selected topics on contemporary problems in transportation engineering; application of ongoing research from resident and visiting faculty. This course is repeatable for a maximum of 9 credits.

CE 591. TRANSPORTATION SYSTEMS ANALYSIS, PLANNING, AND POLICY (3). The systems approach and its applications to transportation engineering and planning. The making of transportation plans and policies. Development of transportation models. Transportation system performance. Decision analysis. Evaluation of transportation projects. Environmental and social impacts of transportation.

CE 592. PAVEMENT STRUCTURES (3). Design and rehabilitation of pavement structures for streets, highways, and airports. **PREREQS:** CE 392

CE 593. TRAFFIC FLOW ANALYSIS AND CONTROL (4). Traffic operations and control systems; traffic flow theory and stream characteristics; capacity analysis; traffic models and simulation; accident and safety improvement. Offered alternate years.

CE 594. TRANSPORTATION FACILITY DESIGN (4). Location and design of highways, and other surface transportation terminals; design for safety, energy efficiency, and environmental quality. Offered alternate years. Lec/rec. **PREREQS:** CE 392

CE 595. TRAFFIC OPERATIONS AND DESIGN (3). Traffic operations and engineering; human and vehicular characteristics; traffic stream characteristics; highway capacity analysis; intersection operation, control and design. **PREREQS:** CE 491*

CE 596. PAVEMENT EVALUATION AND MANAGEMENT (3). Advanced topics in pavement evaluation techniques and pavement management procedures. **PREREQS:** CE 492

CE 597. PUBLIC TRANSPORTATION (3). Characteristics and nature of public transportation systems, including bus, light and heavy rail; financing policy considerations; planning transit service; managing and operating transit systems for small and large urban areas. Offered alternate years.

CE 598. AIRPORT PLANNING AND DESIGN (3). Characteristics and nature of the air transport system. Airport financing, air traffic control. Analysis and design of airports and the airport planning processes. Airport appurtenances. Airport pavement design, environmental facilities and drainage. Offered alternate years.

CE 599. INTELLIGENT TRANSPORTATION SYSTEMS (3). Introduction to intelligent transportation systems, including enabling surveillance, navigation, communication and computer technologies. Application of technologies for monitoring, analysis evaluation and prediction of transportation system performance. Intervention strategies, costs and benefits, safety, human factors, institutional issues and case studies. Offered alternate years. **PREREQS:** CE 491 is a corequisite for new graduate students.

CE 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

CE 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

CE 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

CE 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

CE 607. OCEAN ENGINEERING SEMINAR (1). Presentations from on-campus and off-campus speakers discussing state of technology topics in ocean engineering research, development, and construction. Graded P/N. This course is repeatable for a maximum of 16 credits.

CE 630. OCEAN WAVE MECHANICS I (3). Linear wave boundary value problem formulation and solution, water particle kinematics, shoaling, refraction, diffraction, and reflection. Linear long wave theory with applications to tides, seicheing, and storm surge. **CROSSLISTED** as OC 630. Lec/lab.

CE 631. OCEAN WAVE MECHANICS II (3). Second in the sequence of ocean wave engineering mechanics, covers the following topics: introduction to long wave theory, wave superposition, wave height distribution, and the wind-wave spectrum, introduction to wave forces, and basic nonlinear properties of water waves. May include additional selected topic in wave mechanics. **CROSSLISTED** as OC 631. **PREREQS:** (CE 630 or OC 630)

CE 634. LONG WAVE MECHANICS (3). Theory of long waves. Depth-integrated Euler's equation and its jump conditions. Evolution equations and their solutions. Nonlinear shallow-water waves, the Korteweg-deVries equation and Boussinesq equation. Boundary-layer effects. Shallow-water waves on beaches. Applications of the fundamentals to problems of tsunamis. **CROSSLISTED** as OC 634. **PREREQS:** (CE 630 and CE 631) and OC 670 or equivalent.

CE 635. APPLIED MODELING OF NEARSHORE PROCESSES (4). An introduction to numerical modeling of the nearshore ocean, providing hands-on experience with state-of-the-art numerical models for wave propagation, nearshore circulation, planform shoreline evolution and bathymetric profile evolution. The focus is on review of model requirements, detailed study of several specific models for several domains of interest, application to coastal phenomena, and the interpretation of model results. Offered alternate years. **CROSSLISTED** as OC 635.

CE 639. DYNAMICS OF OCEAN STRUCTURES (3). Dynamic response of fixed and compliant structures to wind, wave and current loading;

Morison equation and diffraction theory for wave and current load modeling, time and frequency domain solution methods; application of spectral and time series analyses; system parameter identification; and stochastic analysis of fatigue and response to extreme loads. Offered alternate years.

CE 640. SELECTED TOPICS IN OCEAN AND COASTAL ENGINEERING (1-3). Selected topics on contemporary problems in ocean and coastal engineering; application of ongoing research from resident and visiting faculty. Offered alternate years. This course is repeatable for a maximum of 9 credits. **PREREQS:** CE 630

CE 642. RANDOM WAVE MECHANICS (3). Random wave theories, probability and statistics of random waves and wave forces, time series analyses of stochastic processes, ocean wave spectra. Offered alternate years. **PREREQS:** CE 630

CE 643. COASTAL ENGINEERING (3). Coastal sediment transport including nearshore currents, longshore onshore-offshore transport, and shoreline configuration; equilibrium beach profile concept with application to shore protection; shoreline modeling; tidal inlet hydrodynamics and inlet stabilization; design criteria for soft structures. Offered alternate years. **PREREQS:** CE 630

CE 645. WAVE FORCES ON STRUCTURES (3). Wave forces on small and large members, dimensional analyses and scaling of equations, identification and selection of force coefficients for Morison equation; compatibility of wave kinematics and force coefficients in Morison equation, diffraction and radiation of surface gravity waves by large floating bodies, wavemaker problem, and reciprocity relations. **PREREQS:** CE 630

CE 647. OCEAN AND COASTAL ENGINEERING MEASUREMENTS (3). Hands-on experience in the conduct of field and laboratory observations, including waves, currents, wind, tides, tsunamis, sediments, bathymetry, shore profiles, wave forces on structures, and structural response. Online data archival and retrieval systems. **PREREQS:** CE 630

CE 808. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

■ CONSTRUCTION ENGINEERING MANAGEMENT COURSES

CEM 263. PLANE SURVEYING (3). Use of field surveying equipment; error analysis; plane surveying methods applied to construction; plane coordinate computations; topographic mapping; and introduction to GPS. Lec/lab. **PREREQS:** (ENGR 211 or ENGR 211H) and sophomore standing in engineering.

CEM 311. HYDRAULICS (4). Pressure and energy concepts of fluids, fluid measurements, flow in pipes and open channels. **PREREQS:** (ENGR 211 or ENGR 211H)

CEM 341. CONSTRUCTION ESTIMATING I (4). Fundamentals of estimating and bidding construction projects; plan reading, specification interpretation; quantity take-off; types of estimates; estimating and methods of construction for sitework, concrete, and carpentry; estimating subcontracts, estimating job overhead and home office overhead; estimating profit, and computer-aided estimating. **PREREQS:** CE 102 and CE 201. CEM 341 and CEM 342 must be taken in order.

CEM 342. CONSTRUCTION ESTIMATING II (4). Fundamentals of estimating and bidding construction projects; plan reading, specification interpretation; quantity take-off; types of estimates; estimating and methods of construction for sitework, concrete, and carpentry; estimating subcontracts, estimating job overhead and home office overhead; estimating profit, and computer-aided estimating. **PREREQS:** CEM 341

CEM 343. CONSTRUCTION PLANNING AND SCHEDULING (4). Principles of construction planning, scheduling, and resource optimization;

scheduling techniques and calculations; methods for integrating project resources (materials, equipment, personnel, and money) into the schedule. **PREREQS:** CEM 342*

CEM 381. STRUCTURES I (4). Introduction to statically determinate analysis and design of steel structures. Lec/rec. **PREREQS:** (ENGR 213 or ENGR 213H)

CEM 383. STRUCTURES II (4). Analysis and design of building elements of concrete and timber; detailing and fabrication. Lec/rec. **PREREQS:** CEM 381

CEM 403. THESIS (1-16). **PREREQS:** Departmental approval required.

CEM 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

CEM 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

CEM 407. SEMINAR (1). Professional practices of construction engineering management.

CEM 431. OBTAINING CONSTRUCTION CONTRACTS (4). Preparing and effectively presenting detailed and complete proposals for the execution of construction projects. **PREREQS:** CEM 341

CEM 441. HEAVY CIVIL CONSTRUCTION MANAGEMENT (4). Heavy civil construction management methods. Construction equipment types, capabilities, costs, productivity, and the selection and planning of equipment needed for a project. Soil characteristics, quantity analysis, and movement on construction sites. **PREREQS:** (FE 315 or CE 372)

CEM 442. BUILDING CONSTRUCTION MANAGEMENT (4). Building construction management and methods. **PREREQS:** .

CEM 443. PROJECT MANAGEMENT FOR CONSTRUCTION (4). Project management concepts for construction; concepts, roles and responsibilities, labor relations and supervision, administrative systems, documentation, quality management, and process improvement. (Writing Intensive Course)

CEM 471. ELECTRICAL FACILITIES (4). Principles and applications of electrical components of constructed facilities; basic electrical circuit theory, power, motors, controls, codes, and building distribution systems. Lec/lab.

CEM 472. MECHANICAL FACILITIES (3). Principles and applications of mechanical components of constructed facilities; heating, ventilating, air conditioning, plumbing, fire protection, and other mechanical construction.

CEM 541. HEAVY CIVIL CONSTRUCTION MANAGEMENT (4). Heavy civil construction management methods. Construction equipment types, capabilities, costs, productivity, and the selection and planning of equipment needed for a project. Soil characteristics, quantity analysis, and movement on construction sites. **PREREQS:** FE 315 or CE 372

CEM 543. PROJECT MANAGEMENT FOR CONSTRUCTION (4). Project management concepts for construction; concepts, roles and responsibilities, labor relations and supervision, administrative systems, documentation, quality management, and process improvement.

CEM 550. CONTEMPORARY TOPICS IN CONSTRUCTION ENGINEERING MANAGEMENT (4). Contemporary topics of emerging technologies and processes, construction engineering and management, how industry environmental change causes development of new technologies, and the applications of the technologies in the field. **PREREQS:** CEM or CE degree or 3 years professional construction experience or instructor approval required.

CEM 551. PROJECT CONTROLS (4). Advanced methods of project controls including advanced technologies and methodologies for quality, time, and cost management; project management organization models, and intra-organizational relationships. **PREREQS:** Graduate standing and CEM or CE degree or 3 years professional construction experience, or instructor approval.

CEM 552. RISK MANAGEMENT IN CONSTRUCTION (4). An introduction to the concept of risk in construction projects and construction firms, including risk definition, identification, assessment and management techniques; contractual risk control, sharing and shedding; and contingency management. **PREREQS:** Graduate standing and CEM or CE degree or 3 years of professional construction experience or instructor approval required.

CEM 553. CONSTRUCTION BUSINESS MANAGEMENT (4). Introduction to concepts of business structures associated with the construction industry; enterprise-level management techniques; extra-organizational risk management; and operational management structuring. **PREREQS:** Graduate standing and CEM or CE degree or three years professional construction experience or instructor approval.

SCHOOL OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

Bella Bose, Associate Director
1148 Kelley Engineering Center
Oregon State University
Corvallis, OR 97331-5501
541-737-3617
Website: <http://eecs.oregonstate.edu/>

FACULTY

Professors Bailey, Bose, Burnett, Conley, Cull (Emeritus), Dieterich, Erwig, Fiez, Lee, Liu, Mayaram, Moon, Pancake, Tadepalli, Temes, von Jouanne, Wager, Weisshaar

Associate Professors Brekken, Budd (Emeritus), Chiang, Dhagat, A. Fern, X. Fern, Hamdaoui, Hanumolu, Jander, Jensen, Magaña, Metoyer, Minoura (Emeritus), Nguyen, Plant, Raiich, Wong, E. Zhang

Assistant Professors Borradaile, Cheng, Cotilla-Sanchez, Dig, Groce, Hendrix, Natarajan, Nayyeri, Ramsey, Rosulek, Scaffidi, Termehchy, Todorovic, Wang, J. Zhang

Senior Instructor Traylor

Instructors Chaney, Jess, McGrath, O'Hara, Parham-Mocello, Rooker, Shuman, Sweet, Van Londen, Wolford

Research Assistant Heer

Assistant Professor Senior

Research Amon, Y. Zhang

Undergraduate Majors

Computer Science
(BA, BS, CRED, HBA, HBS)

Options

Applied Computer Science

*Computer Science Double Degree
(to be renamed CS Professional Degree)*

Computer Systems

Information Systems

Electrical and Computer Engineering
(BS, CRED, HBS)

Undergraduate Minor

Computer Science

Graduate Majors

Computer Science
(MA, MAIS, MEng, MS, PhD)

Graduate Areas of Concentration

Algorithms and Cryptography

Artificial Intelligence and Machine Learning

Computer Systems and Networking

Human-Computer Interaction

Programming Languages

Software Engineering

Electrical and Computer Engineering
(MEng, MS, PhD)

Graduate Areas of Concentration

Analog and Mixed Signal

Artificial Intelligence and Machine Learning

Communications and Signal Processing

Computer Systems

Energy Systems

Materials and Devices

RF/Microwaves

Graduate Minors

Computer Science

Electrical and Computer Engineering

Consistent with the mission of the university and college, the mission of the School of Electrical Engineering and Computer Science at Oregon State University is to provide a comprehensive, state-of-the-art education that prepares our students to be successful in engineering and computing practice and advanced studies.

The school has traditionally strong undergraduate programs and one of the largest graduate programs within the university, with internationally recognized research programs in the areas of mixed signal integration, artificial intelligence and machine learning, computer graphics and vision, energy systems, multimedia and networking, materials and devices, end-user software, human computer interaction, and signal processing and communications systems.

ELECTRICAL AND COMPUTER ENGINEERING

The School of EECS offers programs leading to the BS, MS, MEng, and PhD degrees in Electrical and Computer Engineering (ECE).

Electrical and computer engineers engage in the design, construction and programming, and applications of electronic and integrated circuits, digital computers and embedded systems, power generation and utilization, communication and computer networks, electronic materials and devices, electromagnetic, microwave and optical circuits and systems, control systems and signal processing and conditioning.

Course work leading to the BS degree consists of courses in many of these topics, as well as courses in the supporting disciplines of mathematics, physical sciences, and computer science. Students select further study beyond the required courses, for either more depth in a subdiscipline or further breadth across engineering. Students fulfill humanities and social science requirements as specified by the university's baccalaureate core program. The BS program is supported by well-equipped laboratories providing direct experience with electronic circuits, digital logic, electronic materials, electric machines, IC design, optoelectronics, RF techniques, instrumentation, and microprocessors.

The program incorporates engineering design principles throughout the undergraduate curriculum. This includes the integration of societal, economic, legal, regulatory, ethical, environmental and other factors into the technical aspects of engineering design. Design activities begin in the freshman orientation sequence, which incorporates open-ended design problems, and continues throughout the curriculum. The design experience culminates with a yearlong senior design project. Within the senior design experience, students working in teams complete all phases of a design project under the supervision of a faculty member.

Graduates of this program are prepared either to seek industrial employment or to pursue advanced graduate degrees.

The BS degree in Electrical and Computer Engineering (ECE) is accredited by the Engineering Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone 410-347-7700.

The electrical and computer engineering graduate program provides opportunities for both MS and PhD thesis programs and an MEng course work-based program in the following areas: analog and mixed signals, communications and signal processing, computer systems and networking, energy systems, materials and devices, RF/microwaves. Graduate work is supported by the school's well-equipped laboratory facilities. Opportunities exist for graduate students to participate in many research projects sponsored by private industry and government agencies.

The School of Electrical and Computer Science faculty, advising procedures, undergraduate programs' educational objectives, graduate program application procedures, research areas, and many other aspects may be found at the school's website: <http://eecs.oregonstate.edu/>.

The Multiple Engineering Cooperative Program (MECOP) offers industrial internships to selected students in the discipline areas of computer science, electrical engineering, and computer engineering.

COMPUTER SCIENCE

The School of EECS offers programs leading to BA, BS, MA, MAIS, MEng, MS, and PhD degrees in Computer Science (CS).

Computer science is the heart of cutting-edge computing software. Computer scientists invent software that enables computers to do new things. They design programming languages, compilers, operating systems, games, databases, computer networks, and user interfaces. They solve complex challenging problems in a wide range of fields that can make a positive difference in the world.

Computer science majors learn skills to create realistic graphics, design new problem-solving tools that anyone can use, and create new solutions for business, medical diagnoses, games and entertainment. Their programming skills enable computers to “learn” as they process data, as well as assist in social communication and technologies for the disadvantaged.

Computer science offers a foundation that permits graduates to learn how to make software work well, how to make it fast, how to make it correct, how to find where innovation is needed, and how to understand the people who will be using it, so as to make it genuinely useful and compelling to people. Much of computer science course work is carried out in teams, and students gain experience in teamwork, in professionalism in writing, in working with clients, and in making presentations of their teams’ efforts.

Course work leading to the BS degree consists of required courses in many of these topics, as well as courses in supporting disciplines such as mathematics. The BS program is supported by well-equipped computer laboratories. Students select further study beyond the required core courses, opting for either more depth in computer science, for breadth in business and entrepreneurship, or for grounding in an applications area for their computing skills. The BS program culminates with a yearlong senior capstone project. Within the senior capstone experience, students working in teams complete all phases of a software project under the supervision of a faculty member.

Graduates of this program are prepared either to pursue advanced graduate degrees or to seek employment in business, industry or government.

The BS degree in Computer Science (CS) with Computer Systems option is accredited by Computing Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012, telephone 410-347-7700. The BA degree is not ABET accredited.

The computer science graduate program provides opportunities for MS and PhD thesis, MS non-thesis, and MEng course work-based programs in the following areas: artificial intelligence and machine learning, computer systems and networking, graphics and visualization, human-computer interaction, programming languages, software engineering, algorithms. Graduate work is supported by the school’s well-equipped laboratory facilities. Opportunities exist for graduate students to participate in many research projects sponsored by private industry and government agencies.

The School of Electrical and Computer Science faculty, advising procedures,

undergraduate programs’ educational objectives, graduate program application procedures, research areas, and many other aspects may be found at the school’s website: <http://eecs.oregonstate.edu/>.

The Multiple Engineering Cooperative Program (MECOP) offers internships to selected students in the discipline areas of computer science, electrical engineering, and computer engineering.

UNDERGRADUATE MAJORS WITH OPTIONS

COMPUTER SCIENCE (BA, BS, CRED, HBA, HBS)

Also offered at OSU-Cascades campus.

The computer science undergraduate curriculum has the following objectives:

- 1. Depth.** Graduates will be able to identify, formulate, analyze, and solve computing problems by applying fundamental and advanced mathematical and computer science knowledge and skills. Modern methods and tools will be used to analyze, design, implement and evaluate computer-based systems and processes, emphasizing the role that theoretical underpinnings play in computing practice. Graduates will have developed the discipline required for lifelong learning.
- 2. Breadth.** Graduates will demonstrate a broad understanding at both system and component levels through realistic computing experience. These will include current issues, influences, and trends needed to understand the impact of computing solutions in global and societal contexts.
- 3. Professionalism.** To prepare for the complexity of modern work environments, graduates will have established a foundation of responsible teamwork as well as clear communication skills. They will demonstrate project management capabilities, professional attitudes, and a clear understanding of the ethical issues faced by our profession.
- 4. Trouble-shooting.** Through authentic software engineering experiences in the curriculum, graduates will be able to integrate their knowledge and skills to solve real-world problems. They will be capable of insight and judgment, based on experience in debugging and testing, as well as design to meet quality, reliability and performance constraints.
- 5. Community.** Graduates will emerge as part of a professional and educational community, providing support for their own professional

growth and development, as well as providing avenues for professional service in contributing to the growth and development of future computer scientists. Their community experiences will have included pre-college, undergraduate, and graduate students, faculty, practicing computer scientists, and other professionals, providing avenues for building skills in mentoring, communication, and networking, as well as appreciation for diverse perspectives.

- 6. Innovation.** Graduates will possess a comprehensive computer science education from meeting the first five objectives, providing a solid foundation for developing and applying intuition. In addition, graduates will understand the importance of innovation and how it emerges through the excitement of discovery and associated creativity.

Entering students are able to choose one of four different options:

1. Applied Computer Science (BA, BS, HBA, HBS)
2. Computer Systems (BA, BS, HBA, HBS)
3. Information Systems (BA, BS, HBA, HBS)
4. Computer Science Professional Degree (BS, HBS)

For students entering the undergraduate program, the recommended high school preparation is four years of mathematics, science, and English. High school programming or computer applications courses should not be taken in place of other college preparatory courses.

OPTIONS

APPLIED COMPUTER SCIENCE OPTION

Also offered at OSU-Cascades campus.

The Applied Computer Science option is for students who want to combine the study of computer science with an in-depth examination of a field in which computer science plays an important role. This option requires an approved program of study for each student. Students build their own program of study to include their choice of CS electives plus an Applied CS program. The Computer Science Undergraduate Curriculum Committee reviews these programs of study for approval. Existing OSU minors may be proposed for use both as an Applied CS program and as a minor.

Pre-approved Applied CS programs are available in software systems for sustainability and renewable energy; simulation and game programming; and multimedia. Further details can be found on the

EECS website (<http://eecs.oregonstate.edu/undergraduate/advising.html>), which lists the pre-approved Applied CS programs and their requirements.

Non-MECOP Sample Program for Applied Computer Science Option

Pre-Computer Science

First Year (46)

COMM 111. *Public Speaking (3)^E
or COMM 114. *Argument and Critical Discourse (3)^E
CS 160. Computer Science Orientation (3)^E
Becomes 3 credits effective fall 2014.
CS 161, CS 162. Introduction to Computer Science I, II (4,4)^E
HHS 231. *Lifetime Fitness for Health (2)¹
HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)¹
or any PAC course (1–2)
MTH 231. Elements of Discrete Mathematics (4)^E
MTH 251. *Differential Calculus (4)^E
MTH 252. Integral Calculus (4)^E
WR 121. *English Composition (3)^{1,E}
Biological Science Course (4)¹
Free Electives (3)
*Perspectives Courses (6)¹

Sophomore Year (44)

CS 261. Data Structures (4)^E
CS 271. Computer Architecture and Assembly Language (4)^E
CS 275. Introduction to Databases (4)^E
MTH 232. Elements of Discrete Mathematics (4)
WR 214. *Writing in Business (3)^E
or WR 222. *English Composition (3)^E
Approved courses in applied program (8)
*Difference, Power, and Discrimination Course (3)¹
*Perspectives Courses (6)¹
Physical Science Course (4)¹
*Science Course (biological or physical) (4)¹

Professional Computer Science

Junior Year (44)

CS 311. Operating Systems I (4)
CS 325. Analysis of Algorithms (4)
CS 352. Introduction to Usability Engineering (4)
CS 361. ^Software Engineering I (4)
CS 362. Software Engineering II (4)
CS 381. Programming Language Fundamentals (4)
ST 314. Introduction to Statistics for Engineers (3)
WR 327. *Technical Writing (3)
Approved Courses in Applied Program (8)
Free Electives (2)
*Science Course (biological or physical) (4)

Senior Year (46)

CS 372. Introduction to Computer Networks (4)
CS 391. *Social and Ethical Issues in Computer Science (3)
CS 411. Operating Systems II (4)
[Terminated spring 2014]
CS 461, CS 462, CS 463. Senior Software Engineering Project (3,3,2)
Approved Computer Science Electives (8)
Approved Courses in Applied Program (16)
*Contemporary Global Issues Course (3)¹

Total=180

Footnotes:

^E Required for entry into the professional program.

¹ Must be selected to satisfy the requirements of the baccalaureate core.

COMPUTER SCIENCE DOUBLE DEGREE OPTION

The Computer Science Double Degree option is for students who want to combine a bachelor's degree in computer science with a bachelor's degree in another field. Since computer science is relevant in so many diverse disciplines, students can obtain a computer science degree in combination with virtually any other degree. The program of study includes the core courses in computer science, and also includes courses at the leading edge of computing technologies, software design, web development, and mobile/cloud computing.

All of the courses in the Double Degree option are offered through Ecampus, and most of the courses are also offered on-campus.

Second bachelor's degree in another discipline

Students who choose the Computer Science Double Degree option may pursue a degree in computer science concurrently while earning a second bachelor's degree, or may pursue the computer science degree as a post-baccalaureate degree.

Required Computer Science Courses

CS 161. Introduction to Computer Science I (4)
CS 162. Introduction to Computer Science II (4)
CS 225. Discrete Structures in Computer Science (4) [via Ecampus only]
CS 261. Data Structures (4)
CS 271. Computer Architecture and Assembly Language (4)
CS 275. Introduction to Databases (4)
CS 311. Operating Systems I (4)
CS 325. Analysis of Algorithms (4)
CS 352. Introduction to Usability Engineering (4)
CS 361. ^Software Engineering I (4)
CS 362. Software Engineering II (4)
CS 372. Introduction to Computer Networks (4)
CS 440. Database Management Systems (4)
CS 494. Web Development (4)
CS 496. Mobile and Cloud Software Development (4)

Total=60 credits

Footnote:

^ Writing Intensive Course (WIC)

COMPUTER SYSTEMS OPTION

CAC/ABET Accredited

The Computer Systems option is for students who want to take up computer science as a career and seek an in-depth understanding of computer science as an academic discipline. This option provides

excellent preparation for those who plan to work for companies developing systems software or embedded systems. It also provides excellent preparation for those who plan to pursue an MS or PhD in computer science.

Non-MECOP Sample Program for Computer Systems Option

Pre-Computer Science

First Year (46)

COMM 111. *Public Speaking (3)^E
or COMM 114. *Argument and Critical Discourse (3)^E
CS 160. Computer Science Orientation (3)^E
Becomes 3 credits effective fall 2014.
CS 161, CS 162. Introduction to Computer Science I, II (4,4)^E
HHS 231. *Lifetime Fitness for Health (2)¹
HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)¹
or any PAC course (1–2)
MTH 231. Elements of Discrete Mathematics (4)^E
MTH 251. *Differential Calculus (4)^E
MTH 252. Integral Calculus (4)^E
WR 121. *English Composition (3)^{1,E}
Biological Science Course (4)¹
*Perspectives Courses (6)¹
Liberal Arts Electives (3)

Sophomore Year (44)

CS 261. Data Structures (4)^E
CS 275. Introduction to Databases (4)^E
ECE 271. Digital Logic Design (3)^E
MTH 232. Elements of Discrete Mathematics (4)
MTH 254. Vector Calculus I (4)^E
MTH 306. Matrix and Power Series Methods (4)^E
PH 211. *General Physics with Calculus (4)^E
PH 221. Recitation for PH 211 (1)^E
WR 214. *Writing in Business (3)
or WR 222. *English Composition (3)
*Difference, Power, and Discrimination Course (3)¹
CS or Liberal Arts Electives (4)
*Perspectives Courses (6)¹

Professional Computer Science

Junior Year (44)

CS 311. Operating Systems I (4)
CS 321. Introduction to Theory of Computation (3)
CS 325. Analysis of Algorithms (4)
CS 361. ^Software Engineering I (4)
CS 362. Software Engineering II (4)
CS 372. Introduction to Computer Networks (4)
CS 381. Programming Language Fundamentals (4)
ECE 375. Computer Organization and Assembly Language Programming (4)
PH 212, PH 213. *General Physics with Calculus (4,4)
PH 222, PH 223. Recitation for PH 212, PH 213 (1,1)
WR 327. *Technical Writing (3)

Senior Year (46)

CS 391. *Social and Ethical Issues in Computer Science (3)
CS 411. Operating Systems II (4)
[Terminated spring 2014]

CS 461, CS 462, CS 463. Senior Software Engineering Project (3,3,2)
 CS 472. Computer Architecture (4)
 CS 480. Translators (4)
 MTH 351. Introduction to Numerical Analysis (3)
 ST 314. Introduction to Statistics for Engineers (3)
 Approved Computer Science Electives (8)
 *Contemporary Global Issues Course (3)¹
 CS or Liberal Arts Electives (6)

Total=180

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

^E Required for entry into the professional program.

¹ Must be selected to satisfy the requirements of the baccalaureate core.

INFORMATION SYSTEMS OPTION

The Information Systems option includes the core classes in computer science, but also incorporates the Business and Entrepreneurship minor. In addition to providing a solid grounding in both fields, this program prepares the student for entry into the one-year MBA program offered by OSU's College of Business. By following both of these programs, a student can complete the BS in Computer Science and the MBA in five years.

**Non-MECOP Sample Program for Information Systems Option
Pre-Computer Science**

First Year (46)

COMM 111. *Public Speaking (3)^E
 or COMM 114. *Argument and Critical Discourse (3)^E

CS 160. Computer Science Orientation (3)^E
Becomes 3 credits effective fall 2014.

CS 161, CS 162. Introduction to Computer Science I, II (4,4)^E

HHS 231. *Lifetime Fitness for Health (2)¹

HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)¹
 or any PAC course (1–2)

MTH 231. Elements of Discrete Mathematics (4)^E

MTH 251. *Differential Calculus (4)^E

MTH 252. *Integral Calculus (4)^E

WR 121. *English Composition (3)^{1,E}

*Biological Science Course (4)

*Perspectives Courses (6)¹

Free Electives (3)

Sophomore Year (45)

CS 261. Data Structures (4)^E

CS 271. Computer Architecture and Assembly Language (4)^E

CS 275. Introduction to Databases (4)^E

ECON 201. *Introduction to Microeconomics (4)^E

MTH 232. Elements of Discrete Mathematics (4)

WR 214. *Writing in Business (3)^E

or WR 222. *English Composition (3)^E
 Business and Entrepreneurship Minor Courses (8)

*Difference, Power, and Discrimination Course (3)¹

*Perspectives Course (3)¹

*Physical Science Course (4)¹

Free Electives (4)

**Professional Computer Science
Junior Year (45)**

CS 311. Operating Systems I (4)

CS 325. Analysis of Algorithms (4)

CS 361. ^Software Engineering I (4)

CS 362. Software Engineering II (4)

CS 372. Introduction to Computer Networks (4)

CS 381. Programming Language Fundamentals (4)

ST 314. Introduction to Statistics for Engineers (3)

WR 327. *Technical Writing (3)

Business and Entrepreneurship Minor Courses (8)

Free Electives (3)

*Science Course (physical or biological) (4)¹

Senior Year (44)

CS 391. *Social and Ethical Issues in Computer Science (3)

CS 411. Operating Systems II (4)

[Terminated spring 2014]

CS 440. Database Management Systems (4)

CS 461, CS 462, CS 463. Senior Software Engineering Project (3,3,2)

Approved Computer Science Electives (8)
 Business and Entrepreneurship Minor Courses (12)

*Contemporary Global Issues Course (3)¹

Free Electives (2)

Total=180

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

^E Required for entry into the professional program.

¹ Must be selected to satisfy the requirements of the baccalaureate core.

ELECTRICAL AND COMPUTER ENGINEERING (BS, CRED, HBS)

EAC/ABET Accredited

The curriculum in electrical and computer engineering provides a wide range of opportunities in undergraduate study in the electrical engineering areas of communications, signal processing and controls, electronics and integrated circuits, power electronics and energy systems, materials and devices, electromagnetism, microwaves and optics, and the computer engineering areas of computer architecture, digital hardware design, and computer networks.

The electrical and computer engineering undergraduate program has the following objectives:

1. Depth. Graduates will be able to identify, formulate, analyze and solve ECE problems by applying fundamental and advanced mathematical, scientific, and engineering knowledge and skills. Modern engineering techniques, skills and tools (hardware and software) will be used, emphasizing

the role that computers play in engineering practice. Graduates will have developed the discipline required for lifelong learning.

2. Breadth. Graduates will demonstrate a broad understanding at both system and component levels through realistic engineering experiences. These will include current issues, influences, and trends needed to understand the impact of ECE solutions in global and societal contexts.

3. Professionalism. To prepare for the complexity of modern work environments, graduates will have established a foundation of responsible teamwork as well as clear communication skills. They will demonstrate project management capabilities, professional attitudes, and a clear understanding of the ethical issues faced by our profession.

4. Trouble-shooting. Through authentic engineering experiences in the curriculum, graduates will be able to integrate their knowledge and skills to solve real-world problems. They will be capable of engineering insight and judgment, based on experience in trouble-shooting as well as design to meet quality, reliability and manufacturing constraints.

5. Community. Graduates will emerge as part of a professional and educational community, providing support for their own professional growth and development, as well as providing avenues for professional service in contributing to the growth and development of future engineers. Their community experiences will have included pre-college, undergraduate, and graduate students, faculty, practicing engineers, and other professionals, providing avenues for building skills in mentoring, communication, and networking, as well as appreciation for diverse perspectives.

6. Innovation. Graduates will possess a comprehensive engineering education from meeting the first five objectives, providing a solid foundation for developing and applying engineering intuition. In addition, graduates will understand the importance of innovation and how it emerges through the excitement of discovery and associated creativity.

The electrical and computer engineering undergraduate program includes a common set of core courses that provides a solid foundation plus a 30-credit non-transcript-visible concentration. The concentrations allow students to prepare for industry, graduate study, or other

career paths, specializing or broadening further their knowledge and skills. The concentrations currently offered are 'Computer and Network,' 'Energy Systems,' 'Integrated Circuits,' 'Systems, Signals and Communications,' 'Materials and Devices,' 'RF/Microwaves and Optoelectronics,' and 'Robotics and Control.'

Restricted electives must be selected from 300- or 400-level College of Engineering or College of Science courses (but not baccalaureate core perspective or synthesis courses), and ENGR 211, ENGR 212, ENGR 213 (if not required). Restricted electives *must* have technical prerequisites. Except as approved by the ECE curriculum committee, all concentrations will include a minimum of 16 credits of additional 300- or 400-level ECE courses.

The ECE curriculum has been designed to meet the following minimum requirements, which still must be met if specific courses are waived:

- Mathematics and basic sciences: 45 credits
- Engineering science and design: 67.5 credits
- Upper-division courses: 60 credits

Non-MECOP Sample Program for ECE Majors

Pre-Professional Electrical and Computer Engineering Curriculum

Freshman Year (46–49)

CH 201. Chemistry for Engineering Majors (3)^E

or CH 231. *General Chemistry (4) *and* CH 261. *Laboratory for Chemistry 231 (1)^E

CS 161. Introduction to Computer Science I (4)⁵

or ECE 152. Introduction to Programming II with Embedded Control Lab (4)⁵

ECE 111. Introduction to ECE: Tools (3)

ECE 112. Introduction to ECE: Concepts (3)^E

ECE 271. Digital Logic Design (3)⁵

ECE 272. Digital Logic Design Laboratory (1)⁵

HHS 231. *Lifetime Fitness for Health (2)¹

HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)¹

or any PAC course (1–2)

MTH 231. Elements of Discrete Mathematics (4)⁵

MTH 251. *Differential Calculus (4)^E

MTH 252. Integral Calculus (4)^E

MTH 254. Vector Calculus I (4)^E

PH 211. *General Physics with Calculus (4)^E

WR 121. *English Composition (3)^E

Perspectives course (3)¹

Sophomore Year (44)

COMM 111. *Public Speaking (3)^E

or COMM 114. *Argument and Critical Discourse (3)^E

CS 162. Introduction to Computer Science II (4)⁵

CS 261. Data Structures (4)⁵

ENGR 201. Electrical Fundamentals I (3)^E

ENGR 202. Electrical Fundamentals II (3)^E

ENGR 203. Electrical Fundamentals III (3)⁵

MTH 255. Vector Calculus II (4)

MTH 256. Applied Differential Equations (4)^E

MTH 306. Matrix and Power Series Methods (4)^E

PH 212. *General Physics with Calculus (4)^E

PH 213. *General Physics with Calculus (4)^E

WR 327. *Technical Writing (3)

Elective (1)

Professional Electrical and Computer Engineering Curriculum

Junior Year (45–46)

ECE 322. Electronics I (4)

ECE 323. Electronics II (4)

ECE 351. Signals and Systems I (3)

ECE 352. Signals and Systems II (4)

ECE 353. Introduction to Probability and Random Signals (3)

ECE 391. Transmission Lines (3)⁶

or ECE/CS 372. Introduction to Computer Networks (4)⁶

ECE 375. Computer Organization and Assembly Language Programming (4)

ENGR 391. Engineering Economics and Project Management (3)

Biological Science course with lab (4)¹

Perspectives courses (6)¹

Concentration-Specific courses (7)

Senior Year (46–47)

ECE 391. Transmission Lines (3)⁶

or ECE/CS 372. Introduction to Computer Networks (4)⁶

ECE 441, ECE 442, ECE 443. ^Engineering Design Project (3,3,2)

Difference, Power and Discrimination course (3)¹

Perspectives course (3)¹

Concentration-Specific courses (23)

Contemporary Global Issues course (3)¹

CS 391. *Social and Ethical Issues in Computer Science (3)

Total=180

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Core Course (WIC)

^E Required for entry into the professional program.

¹ Must be selected to satisfy the requirements of the baccalaureate core.

⁵ Prerequisite for required upper-division courses. Recommended for completion prior to entry into the professional engineering program.

⁶ Which of these courses a student takes in which academic year depends on their chosen concentration.

COMPUTER SCIENCE MINOR

Computing has become pervasive, touching nearly every aspect of our lives. A minor in Computer Science can open up opportunities for employment in the software development industry, but also in many areas including healthcare, business, science, medicine, graphics, utilities and education. Courses will teach theory, problem-solving skills, and to program.

Computer Science Minor

Requirements (36 credits total)

To earn the minor upon graduation, students must meet all of the following:

1. Earn a C in each of their minor courses (all courses must be taken A–F grading)
2. Have a minimum 2.25 GPA in all required minor course work (36 credits)

Lower-Division Computer Science Minor Requirements (20 credits)

CS 161. Introduction to Computer Science I (4)

CS 162. Introduction to Computer Science II (4)

CS 261. Data Structures (4)

CS 271. Computer Architecture and Assembly Language (4)¹

MTH 231. Elements of Discrete Mathematics (4)

or CS 225. Discrete Structures in Computer Science (4)

Students may declare the Computer Science minor after completing the lower-division required courses with a GPA of 2.25 or higher and after becoming eligible to take 300-level courses in their major. Please speak with an EECs advisor to declare the minor.

Upper-Division Computer Science Minor Requirements (16 credits)^{2, 3}

CS 362. Software Engineering II (4)

Recommended elective courses might include (but not limited to) (12 credits):

CS 344. Operating Systems (4) [*Pending approval*]

CS 352. Introduction to Usability Engineering (4)

CS 361. ^Software Engineering I (4)

CS 440. Database Management Systems (4)

CS 475. Introduction to Parallel Computing (4)

CS 496. Mobile and Cloud Software Development (4)

Other upper-division courses are acceptable; please speak with an advisor about which courses might create the best path for your goals.

Courses that cannot be used for minor requirements:

CS 391. *Social and Ethical Issues in Computer Science (3)

CS 395. Interactive Multimedia (4)

CS 401. Research (1–16)

CS 405. Reading and Conference (1–16)

CS 407. Seminar (1–16)

CS 410. Occupational Internship (1–16)

CS 461. Senior Software Engineering Project (3)

or CS 462. Senior Software Engineering Project (3)

or CS 463. Senior Software Engineering Project (2)

CS 494. Web Development (4)

CS 495. Interactive Multimedia Projects (4)

Footnotes:

¹ Electrical and Computer Engineering (ECE) students who wish to minor in Computer Science must take ECE 271 (3) and ECE 272 (1), instead of CS 271.

² Electrical and Computer Engineering (ECE) students will take ECE 375. Computer Organization and Assembly Language Programming (4) and CS/ECE 372. Introduction to Computer Networks (4) plus 4 credits of upper-division computer science courses.

³ Electrical and Computer Engineering (ECE) students can take the following courses that will count both as an ECE restrictive elective for the ECE major and as well as towards the CS minor: CS 344 [Pending approval], CS 325, CS 331, CS 444 [Pending approval], CS 434, CS 450, CS/ECE 472, CS/ECE 476

* Baccalaureate Core Course

^ Writing Intensive Course

GRADUATE MAJORS

COMPUTER SCIENCE (MA, MEng, MS, PhD, MAIS)

Graduate Areas of Concentration
Algorithms and cryptography; artificial intelligence and machine learning; computer systems and networking; human-computer interaction; programming languages; software engineering

See EECS website for complete information: <http://eecs.oregonstate.edu/> research.

The master's program provides advanced instruction beyond the undergraduate degree. It prepares students for careers in which a higher level of experience is required. The PhD program prepares students for work in government or industry research laboratories or industry research laboratories or for careers at universities.

Additional areas of concentration may be arranged with other departments. For example, numerical analysis or computer algebra with the Department of Mathematics.

For additional information, contact Nicole Thompson, Graduate Coordinator, School of EECS, OSU, Corvallis, OR 97331-5501, 541-737-7234, email: eecs.gradinfo@oregonstate.edu. Additional information concerning courses, advising, procedures, faculty and many other aspects of the program may be found in the school's website at <http://eecs.oregonstate.edu/>.

ELECTRICAL AND COMPUTER ENGINEERING (MEng, MS, PhD)

Graduate Areas of Concentration
Analog and mixed signal; artificial intelligence and machine learning; communications and signal processing; computer systems; energy systems; materials and devices; RF/microwaves

See EECS website for complete information: <http://eecs.oregonstate.edu/> research.

The School of Electrical and Computer Engineering offers graduate programs leading to Master of Engineering, Master of Science, and Doctor of Philosophy degrees focusing on the major areas listed below. The master's program provides advanced instruction beyond the undergraduate degree. It prepares students for careers in which a higher level of experience is required. The Master of Engineer-

ing degree is a course work-only degree with no required thesis or project report. The PhD program prepares students for work in government or industry research laboratories or careers at universities. Students are encouraged to develop programs of study in close cooperation with the faculty members in their areas of interest.

Graduate work is supported by the school's well-equipped laboratory facilities. Opportunities exist for graduate students to participate in many research projects sponsored by private industry and government agencies.

For more information, contact Nicole Thompson, Graduate Coordinator, School of Electrical Engineering and Computer Science, OSU, Corvallis, OR 97331-5501; 541-737-7234; email: eecs.gradinfo@oregonstate.edu.

Additional information concerning courses, advising procedures, faculty, and many other aspects of the school may be found in the school's website at <http://eecs.oregonstate.edu/>.

COMPUTER SCIENCE GRADUATE MINOR

For more details, see the school advisor.

ELECTRICAL AND COMPUTER ENGINEERING GRADUATE MINOR

For more details, see the school advisor.

COMPUTER SCIENCES COURSES

CS 101. COMPUTERS: APPLICATIONS AND IMPLICATIONS (4). The varieties of computer hardware and software. The effects, positive and negative, of computers on human lives. Ethical implications of information technology. Hands-on experience with a variety of computer applications. Lec/lab.

CS 151. INTRODUCTION TO PROGRAMMING I WITH EMBEDDED CONTROL LAB (4). Thorough treatment of the basic elements of C, bitwise operations, flow of control, input/output, functions, arrays, strings, and structures. Lec/lab. CROSSLISTED as ECE 151. **PREREQS:** (MTH 111 or MTH 112 or (MTH 251 or MTH 251H)) or Placement Test

CS 160. COMPUTER SCIENCE ORIENTATION (3). Introduction to the computer science field and profession. Team problem solving. Introduction to writing computer programs. Lec/lab. **PREREQS:** Wireless laptop required.

CS 161. INTRODUCTION TO COMPUTER SCIENCE I (4). Overview of fundamental concepts of computer science. Introduction to problem solving, software engineering, and object-oriented programming. Includes algorithm design and program development. Lec/lab. **PREREQS:** MTH 112* or Placement Test or Placement Test and for CS Double Degree students: BA/BS and (MTH 111 or MPT>=24 or MPAL>=061)

CS 162. INTRODUCTION TO COMPUTER SCIENCE II (4). Basic data structures. Computer programming techniques and application of software engineering principles. Introduction to analysis of programs. Lec/lab. **PREREQS:** (CS 161 and (MTH 231* or CS 225*))

CS 165. ACCELERATED INTRODUCTION TO COMPUTER SCIENCE (8). Overview of the fundamental concepts of computer science.

Introduction to problem solving, algorithm development, data types, and basic data structures. Introduction to analysis of algorithms and principles of software engineering. System development and computer programming using procedural/object-oriented paradigms. (Note: Students may take either the CS 161/162 sequence or CS 165, but cannot receive credit for both.) Offered via Ecampus only. **PREREQS:** (MTH 111 or Placement Test) or Placement Test and (CS 225* or MTH 231*) and Ecampus students must have a BA or BS.

CS 195. INTRODUCTION TO WEB AUTHORING (4). Techniques and tools for designing and publishing on the World Wide Web; hypertext and HTML; site and page design; media integration; issues raised by Internet publishing. **PREREQS:** CS 101 or equivalent.

CS 199. SELECTED TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

CS 225. DISCRETE STRUCTURES IN COMPUTER SCIENCE (4). An introduction to the discrete mathematics of computer science, including logic, set and set operations, methods of proof, recursive definitions, combinatorics, and graph theory. (Note: Students may take either MTH 231 or CS 225, but cannot receive credit for both.) **PREREQS:** MTH 111 or Placement Test or Placement Test or MTH 112* and for CS Double Degree students: BA/BS and (MTH 111 or MPT>=24 or MPAL>=61)

CS 261. DATA STRUCTURES (4). Abstract data types, dynamic arrays, linked lists, trees and graphs, binary search trees, hash tables, storage management, complexity analysis of data structures. Lec/rec. **PREREQS:** (CS 162 or CS 165 or EECS 162) and (CS 225 or MTH 231)

CS 262. PROGRAMMING PROJECTS IN C++ (4). Learning a second computer programming language. Elements of C++. Object-oriented programming. Experience team work on a large programming project. **PREREQS:** CS 261

CS 271. COMPUTER ARCHITECTURE AND ASSEMBLY LANGUAGE (4). Introduction to functional organization and operation of digital computers. Coverage of assembly language; addressing, stacks, argument passing, arithmetic operations, decisions, macros, modularization, linkers and debuggers. **PREREQS:** (CS 151 or CS 161 or CS 165 or ECE 151)

CS 275. INTRODUCTION TO DATABASES (4). Design and implementation of relational databases, including data modeling with ER or UML diagrams, relational schema, SQL queries, relational algebra, user interfaces, and administration. **PREREQS:** (CS 162 or CS 165 or ECE 152)

CS 295. INTERMEDIATE WEB AUTHORING (4). Designing, developing, publishing, and maintaining dynamic websites; Web security and privacy issues; emerging Web technologies. **PREREQS:** CS 195 or equivalent (i.e., basic HTML and CSS)

CS 312. LINUX SYSTEM ADMINISTRATION (4). Introduction to LINUX system administration. Network administration and routing. Internet services. Security issues. **PREREQS:** CS 311 or CS 344 and /or instructor approval.

CS 321. INTRODUCTION TO THE THEORY OF COMPUTATION (3). Survey of models of computation including finite automata, formal grammars, and Turing machines. **PREREQS:** (CS 261 and MTH 232)

CS 321H. INTRODUCTION TO THEORY OF COMPUTATION (3). Survey of models of computation including finite automata, formal grammars, and Turing machines. **PREREQS:** (CS 261 and MTH 232) and Honors College approval required.

CS 325. ANALYSIS OF ALGORITHMS (4). Recurrence relations, combinatorics, recursive algorithms, proofs of correctness. **PREREQS:** (CS 261 and (MTH 232 or CS 225))

CS 325H. ANALYSIS OF ALGORITHMS (4). Recurrence relations, combinatorics, recursive algorithms, proofs of correctness. **PREREQS:** (CS 261 and (MTH 232 or CS 225)) and Honors College approval required.

CS 331. INTRODUCTION TO ARTIFICIAL INTELLIGENCE (4). Fundamental concepts in artificial intelligence using the unifying theme of an intelligent agent. Topics include agent architectures, search, games, logic and reasoning, and Bayesian networks. **PREREQS:** (CS 325 or CS 325H)

CS 352. INTRODUCTION TO USABILITY ENGINEERING (4). Basic principles of usability engineering methods for the design and evaluation of software systems. Includes the study of human-machine interactions, user interface characteristics and design strategies, software evaluation methods, and related guidelines and standards. **PREREQS:** (CS 151 or CS 161 or CS 165 or CS 295 or ECE 151)

CS 361. ^SOFTWARE ENGINEERING I (4). Introduction to the “front end” of the software engineering lifecycle; requirements analysis and specification; design techniques; project management. (Writing Intensive Course)

CS 362. SOFTWARE ENGINEERING II (4). Introduction to the «back end» of the software engineering lifecycle implementation; verification and validation; debugging; maintenance. **PREREQS:** CS 261 and Experience with object-oriented programming and data structures (e.g. CS 161, CS 162, CS 261). CS 361 is recommended but not required.

CS 372. INTRODUCTION TO COMPUTER NETWORKS (4). Computer network principles, fundamental networking concepts, packet-switching and circuit switching, TCP/IP protocol layers, reliable data transfer, congestion control, flow control, packet forwarding and routing, MAC addressing, multiple access techniques. Lec. **CROSSLISTED** as ECE 372. **PREREQS:** CS 261 and (ECE 271 or CS 271) and C programming and Unix familiarity.

CS 381. PROGRAMMING LANGUAGE FUNDAMENTALS (4). An introduction to the concepts found in a variety of programming languages. Programming languages as tools for problem solving. A brief introduction to languages from a number of different paradigms. **PREREQS:** (CS 261 and MTH 232)

CS 391. *SOCIAL AND ETHICAL ISSUES IN COMPUTER SCIENCE (3). In-depth exploration of the social, psychological, political, and ethical issues surrounding the computer industry and the evolving information society. (Bacc Core Course) **PREREQS:** CS 101 or computer literacy.

CS 391H. *SOCIAL AND ETHICAL ISSUES IN COMPUTER SCIENCE (3). In-depth exploration of the social, psychological, political, and ethical issues surrounding the computer industry and the evolving information society. (Bacc Core Course) **PREREQS:** CS 101 or computer literacy and Honors College approval required.

CS 395. INTERACTIVE MULTIMEDIA (4). Technological, aesthetic, and pedagogical issues of communication using interactive multimedia and hypermedia; techniques for authoring interactive multimedia projects using a variety of digital media tools. **PREREQS:** ART 120 and CS 101

CS 401. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

CS 403. THESIS (1-16). **PREREQS:** Departmental approval required.

CS 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of

16 credits. **PREREQS:** Departmental approval required.

CS 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

CS 407. SEMINAR (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

CS 407H. SEMINAR (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

CS 410. OCCUPATIONAL INTERNSHIP (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

CS 419. SELECTED TOPICS IN COMPUTER SCIENCE (1-5). Topics of special and current interest not covered in other courses. This course is repeatable for a maximum of 99 credits. **PREREQS:** Varies by class offering, senior standing in computer science.

CS 419H. SELECTED TOPICS IN COMPUTER SCIENCE (1-5). Topics of special and current interest not covered in other courses. This course is repeatable for a maximum of 99 credits. **PREREQS:** Varies by class offering, senior standing in computer science. Honors College approval required.

CS 420. GRAPH THEORY WITH APPLICATIONS TO COMPUTER SCIENCE (3). Directed and undirected graphs; paths, circuits, trees, coloring, planar graphs, partitioning; computer representation of graphs and graph algorithms; applications in software complexity metrics, program testing, and compiling. **PREREQS:** (CS 325 or CS 325H) and MTH 232

CS 434. MACHINE LEARNING AND DATA MINING (4). Introduction to machine learning and data mining algorithms (supervised learning, unsupervised learning, and reinforcement learning) tools that are widely employed in industrial and research settings. **PREREQS:** (CS 325 or CS 325H)

CS 440. DATABASE MANAGEMENT SYSTEMS (4). Relational database design, normalization, file structures, disk storage, query processing and optimization, team development of database applications. **PREREQS:** CS 261 and CS 275

CS 450. INTRODUCTION TO COMPUTER GRAPHICS (4). 2-D and 3-D graphics APIs. Modeling transformations. Viewing specification and transformations. Projections. Shading. Texture mapping. Traditional animation concepts. 3-D production pipeline. Keyframing and kinematics. Procedural animation. **PREREQS:** (CS 261 and (MTH 306 or MTH 306H or MTH 341))

CS 461. SENIOR SOFTWARE ENGINEERING PROJECT (3). Utilize software engineering methodology in a team environment to develop a real-world application. Teams will be responsible for all phases of software development, including project planning, requirements analysis, design, coding, testing, configuration management, quality assurance, documentation, and delivery. Three-term sequence required. **PREREQS:** CS 361

CS 462. SENIOR SOFTWARE ENGINEERING PROJECT (3). Utilize software engineering methodology in a team environment to develop a real-world application. Teams will be responsible for all phases of software development, including project planning, requirements analysis, design, coding, testing, configuration management, quality assurance, documentation, and delivery. Three-term sequence required. **PREREQS:** (CS 362 and CS 461)

CS 463. SENIOR SOFTWARE ENGINEERING PROJECT (2). Utilize software engineering methodology in a team environment to develop a real-world application. Teams will be responsible for all phases of software development, including project planning, requirements analysis, design, coding, testing, configuration management, quality

assurance, documentation, and delivery. Three-term sequence required. **PREREQS:** CS 462

CS 466. WEB-BASED START-UP PROJECT (4). Real-world, hands-on learning in a high-tech web/mobile-based company environment. Research in the development of product ideas, hypotheses, and business models to create customer experiments. Prototyping and statistical analysis to develop, optimize, and evaluate solutions. Rapid iteration/refactoring based on customer input, web analytics, and user engagement metrics. Offered at OSU-Cascades only. **COREQS:** CS 461

CS 472. COMPUTER ARCHITECTURE (4). Computer architecture using processors, memories, and I/O devices as building blocks. Issues involved in the design of instruction set architecture, processor, pipelining and memory organization. Design philosophies and trade-offs involved in Reduced Instruction Set Computer (RISC) architectures. Lec/lab. **CROSSLISTED** as ECE 472/ECE 572. **PREREQS:** ECE 375

CS 475. INTRODUCTION TO PARALLEL COMPUTING (4). Theoretical and practical survey of parallel processing, including a discussion of parallel architectures, parallel programming language, and parallel algorithms. Programming one or more parallel computers in a higher-level parallel language. **PREREQS:** (CS 325 or CS 325H)

CS 476. ADVANCED COMPUTER NETWORKING (4). Advanced networking concepts: congestion control and avoidance, multimedia and QoS, queueing theory, buffer management, scheduling and fairness policies, wireless and mobile networks, service models, network security. **CROSSLISTED** as ECE 476/ECE 576. **PREREQS:** (CS 372 or ECE 372)

CS 480. TRANSLATORS (4). An introduction to compilers; attribute grammars, syntax-directed translation, lex, yacc, LR(1) parsers, symbol tables, semantic analysis, and peep-hole optimization. **PREREQS:** (CS 311 or CS 344) and CS 321)

CS 491. COMPUTER SCIENCE SKILLS FOR SIMULATION AND GAME PROGRAMMING (4). Game and simulation development is very much a data and math-intensive activity. A certain number of actions must be produced, and producing them by hand is hard. This is a middleware CS course that fills in many of the missing pieces for those wanting to enter the simulation and game development worlds in a software tool-building capacity. **PREREQS:** CS 261 and MTH 232 and MTH 251 and MTH 252

CS 494. WEB DEVELOPMENT (4). Techniques and tools for designing developing, publishing, and maintaining dynamic websites on the World Wide Web. Hypertext/HTML, scripting, media integration, emerging web technologies. Web security and issues raised by Internet publishing. **PREREQS:** CS 101 or equivalent. Computer literacy required.

CS 495. INTERACTIVE MULTIMEDIA PROJECTS (4). Students apply principles and procedures of digital art, design, communication, and software authoring while working on large integrated media projects. **PREREQS:** CS 395

CS 496. MOBILE AND CLOUD SOFTWARE DEVELOPMENT (4). Introduction to the concepts and techniques for developing mobile and cloud applications. **PREREQS:** CS 311 or CS 344 and students need a working knowledge of at least one operating system in order to be successful in developing mobile and cloud software.

CS 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

CS 501. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 99 credits. **PREREQS:** Departmental approval required.

CS 503. CS MS THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Instructor's consent required.

CS 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 20 credits. **PREREQS:** Departmental approval required.

CS 506. PROJECTS (1-16). Graded P/N. This course is repeatable for a maximum of 99 credits. **PREREQS:** Departmental approval required.

CS 507. SEMINAR (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Graduate standing.

CS 515. ALGORITHMS AND DATA STRUCTURES (4). Greedy algorithms, divide and conquer, dynamic programming, network flow, data structures. **PREREQS:** Graduate standing in computer science and an undergraduate course in algorithms.

CS 516. THEORY OF COMPUTATION AND FORMAL LANGUAGES (4). Models of computation. Universal machines. Unsolvable problems. Nondeterministic computation. Chomsky hierarchy: regular, context-free, context-sensitive and unrestricted grammars; characterization, closure properties, algorithms, and limitations. **PREREQS:** Graduate standing in computer science.

CS 517. THEORY OF COMPUTATION (4). Turing machines, decidability, NP-completeness, complexity classes, randomized computation, relativization, circuit complexity, interactive proof systems, lower bounds, cryptography. **PREREQS:** Graduate standing in computer science.

CS 519. TOPICS IN COMPUTER SCIENCE (1-5). Topics of special and current interest not covered in other courses. May not be offered every year. This course is repeatable for a maximum of 99 credits. **PREREQS:** Varies by class offering.

CS 520. GRAPH THEORY WITH APPLICATIONS TO COMPUTER SCIENCE (3). Directed and undirected graphs; paths, circuits, trees, coloring, planar graphs, partitioning; computer representation of graphs and graph algorithms; applications in software complexity metrics, program testing, and compiling. **PREREQS:** CS 325 and MTH 232

CS 521. COMPUTABILITY (4). Recursive functions. Turing machines. Undecidability. Relativized computation. Complexity classes. **PREREQS:** CS 516

CS 523. ADVANCED ALGORITHMS (4). Approximation algorithms, randomized and probabilistic algorithms, online algorithms. **PREREQS:** CS 515

CS 524. NP-COMPLETE AND HARDER PROBLEMS (4). Complexity classes and reducibilities. NP-Complete problems, proof techniques, and heuristics, approximation algorithms. Provably hard problems. Hierarchies. **PREREQS:** CS 523

CS 527. ERROR-CORRECTING CODES (4). Hamming codes, linear codes, cyclic codes, BCH and Reed-Solomon codes. Introduction to Galois fields. Encoding and decoding algorithms. Burst error correcting codes, asymmetric and unidirectional codes. Applications of codes for computer systems. **PREREQS:** Discrete math and probability

CS 529. SELECTED TOPICS IN THEORETICAL COMPUTER SCIENCE (1-5). Topics of interest in algorithms and theory of computation. Topics include approximation algorithms, planar graph algorithms, distributed algorithms, combinatorial optimization, computational geometry. This course is repeatable for a maximum of 99 credits. **PREREQS:** CS 515

CS 531. ARTIFICIAL INTELLIGENCE (4). Intelligent agents. Problem-solving as heuristic search. Adversarial search. Constraint satisfaction methods; Arc-consistency. Knowledge representation and reasoning. Propositional logic. Reasoning with propositional logic: algorithms for satisfiability. First-order logic. Proof theory, model

theory, resolution refutation, forward and backward chaining, representing events and actions. Lec/lab. **PREREQS:** Graduate standing in computer science.

CS 532. ADVANCED ARTIFICIAL INTELLIGENCE (4). Knowledge representation, reasoning, and learning with relational and first-order representations. First-order logic: proof theory, model theory, resolution refutation, Prolog-style resolution. Inductive logic programming. Complex belief networks: Hidden Markov models, Viterbi algorithm, Forward-backward algorithm. Learning HMMs with EM. Probabilistic relational models: exact and stochastic inference algorithms. Learning methods for probabilistic relational models. **PREREQS:** CS 531

CS 533. INTELLIGENT AGENTS AND DECISION MAKING (4). Representations of agents, execution architectures. Planning: non-linear planning, graphplan, SATplan. Scheduling and resource management. Probabilistic agents. Dynamic belief networks. Dynamic programming (value iteration and policy iteration). Reinforcement learning: Prioritized sweeping, Q learning, value function approximation and SARSA (lambda), policy gradient methods. **PREREQS:** CS 531

CS 534. MACHINE LEARNING (4). Continuous representations. Bias-variance tradeoff. Computational learning theory. Gaussian probabilistic models. Linear discriminants. Support vector machines. Neural networks. Ensemble methods. Feature extraction and dimensionality reduction methods. Factor analysis. Principle component analysis. Independent component analysis. Cost-sensitive learning. **PREREQS:** Graduate standing.

CS 535. CYBERNETICS (4). Control and communication organisms and machines; neural nets, cellular automata, L-systems, genetic algorithms. **PREREQS:** Graduate standing.

CS 536. PROBABILISTIC GRAPHICAL MODELS (4). Representation of probabilistic graphical models, both directed (Bayesian networks) and undirected (Markov networks). Exact and approximate inference techniques. Parameter and structure learning from data. **PREREQS:** Graduate standing with strong programming skills.

CS 539. SELECTED TOPICS IN ARTIFICIAL INTELLIGENCE (1-5). Advanced topics in artificial intelligence. Typical topics include machine learning for sequential and spatial data, knowledge representation and inference, probabilistic modeling of complex systems, data mining and information extraction. This course is repeatable for a maximum of 12 credits. **PREREQS:** Instructor's approval required.

CS 540. DATABASE MANAGEMENT SYSTEMS (4). Purpose of database systems, levels of data representation. Entity-relationship model. Relational systems: data definition, data manipulation, query language (SQL), relational calculus and algebra, data dependencies and normal forms. DBTG network model. Query optimization, recovery, concurrency control. **PREREQS:** CS 261 or graduate standing in computer science.

CS 549. SELECTED TOPICS IN INFORMATION-BASED SYSTEMS (1-5). Current topics in information-based systems, e.g. information management for CAD, geographical information systems, distributed information systems, data models for complex applications. This course is repeatable for a maximum of 99 credits. **PREREQS:** CS 540

CS 550. INTRODUCTION TO COMPUTER GRAPHICS (4). 2-D and 3-D graphics APIs. Modeling transformations. Viewing specification and transformations. Projections. Shading. Texture mapping. Traditional animation concepts. 3-D production pipeline. Keyframing and kinematics. Procedural animation. **PREREQS:** CS 261 and (MTH 306 or MTH 306H or MTH 341)

CS 551. COMPUTER GRAPHICS (4). 3-D graphics hardware: Line and polygon scan conversion, modeling transformations, viewing transformations, matrix stacks, hierarchical models, perspective and orthographic projections, visible surface determination, illumination models, shading models, texture mapping, ray tracing. **PREREQS:** CS 450 or CS 550

CS 552. COMPUTER ANIMATION (4). Traditional animation concepts: production pipeline, keyframing implementation, interpolation, point-mass dynamics, spring-mass systems, rigid body dynamics, forward and inverse kinematics, human motion control, motion capture. **PREREQS:** CS 551

CS 553. SCIENTIFIC VISUALIZATION (4). Open GLUT, GLUT, and GLUT graphics APIs; hyperbolic projections; mapping scalar values to a variety of color spaces; color gamuts; data visualization using range sliders; scalar visualization; vector visualization; chromaDepth; interpolating splines; Delauney triangulation; magic lenses; volume visualization; texture mapping; terrain mapping; performance graphics programming. **PREREQS:** Prior experience with Unix or Windows, programming experience.

CS 554. GEOMETRIC MODELING IN COMPUTER GRAPHICS (4). Advanced topics in computer graphics focusing on representation and processing of polygonal models and their application. Surface fundamentals; discrete differential geometry and topology; data structures for representing 3-D surfaces; surface subdivision and smoothing; mesh simplification and multi-resolution representation of 3-D surfaces; geometry compression; surface parameterization; geometry remeshing; topological simplification; implicit surfaces. **PREREQS:** CS 450

CS 555. SIGNAL AND IMAGE PROCESSING (4). Fundamental aspects of signal and image processing including image acquisition and display, histograms, level-set and geometric operations, convolutions, Fourier transform, image filtering, sampling theory, image transforms, human vision, color, morphological operations, and image compression. **PREREQS:** Graduate standing and knowledge of C/C++.

CS 556. COMPUTER VISION (4). Algorithm development for automatic interpretation of the three-dimensional world that is captured in a set of images; cameras and image formation; color; keypoint and edge detection; perceptual grouping; segmentation; shape representation; texture; object recognition; optical flow; motion estimation and tracking; and 3-D scene reconstruction from motion and stereo. **PREREQS:** Basic statistics, probability, calculus, linear algebra, good programming skills, machine learning or AI (recommended).

CS 559. SELECTED TOPICS IN COMPUTER GRAPHICS AND VISION (1-5). Advanced topics in graphics, animation, and vision. Topics include distribution ray tracing, global-illumination, radiosity, image-based modeling and rendering, vision-assisted image and video editing, 3-D vision, 3-D virtual environments, 3-D interaction, control for physical simulation, motion graphs, computational geometry, etc. This course is repeatable for a maximum of 12 credits. **PREREQS:** Instructor approval and graduate standing.

CS 561. SOFTWARE ENGINEERING (4). Utilize software engineering methodology in a team environment to develop a real-world application. Teams will be responsible for all phases of software development, including project planning, requirements analysis, design, coding, testing, configuration management, quality assurance, documentation, and delivery. Two-term sequence required. **PREREQS:** CS 362

CS 562. APPLIED SOFTWARE ENGINEERING (4). Application of software engineering methodology to the development of a complete software system. **PREREQS:** CS 561

CS 569. SELECTED TOPICS IN SOFTWARE ENGINEERING (1-5). Topics include new programming methodologies, productivity, software development, software complexity metrics. This course is repeatable for a maximum of 99 credits. **PREREQS:** CS 561

CS 570. HIGH PERFORMANCE COMPUTER ARCHITECTURE (4). Advanced concepts in computer architecture. Performance improvement employing advanced pipelining and multiple instruction scheduling techniques. Issues in memory hierarchy and management. **CROSSLISTED** as ECE 570. **PREREQS:** ECE 472 or ECE 572

CS 572. COMPUTER ARCHITECTURE (4). Computer architecture using processors, memories, and I/O devices as building blocks. Issues involved in the design of instruction set architecture, processor, pipelining and memory organization. Design philosophies and trade-offs involved in Reduced Instruction Set Computer (RISC) architectures. Lec/lab. **CROSSLISTED** as ECE 472/ECE 572. **PREREQS:** ECE 375

CS 575. INTRODUCTION TO PARALLEL COMPUTING (4). Theoretical and practical survey of parallel processing, including a discussion of parallel architecture, parallel programming language, and parallel algorithms. Programming one or more parallel computers in a higher-level parallel language. **PREREQS:** CS 325

CS 576. ADVANCED COMPUTER NETWORKING (4). Advanced networking concepts: congestion control and avoidance, multimedia and QoS, queuing theory, buffer management, scheduling and fairness policies, wireless and mobile networks, service models, network security. **CROSSLISTED** as ECE 476/ECE 576. **PREREQS:** CS 372 or ECE 372

CS 579. TOPICS IN COMPUTER ARCHITECTURE AND PARALLEL PROCESSING (1-5). Current topics in advanced computer architecture and parallel processing. This course is repeatable for a maximum of 99 credits. **PREREQS:** CS 575 or CS 572 or ECE 572

CS 581. PROGRAMMING LANGUAGES (4). A study of the concepts of modern programming and paradigms. **PREREQS:** CS 381

CS 582. OBJECT-ORIENTED ANALYSIS AND PROGRAMMING (4). Introduction to the elements of object-oriented analysis, design and programming techniques. Topics are introduced in a programming language-independent fashion. Topics covered include object-oriented design, classes, methods, inheritance, software reuse.

CS 583. FUNCTIONAL PROGRAMMING (4). Introduction to advanced features of modern functional programming languages and to advanced functional programming techniques. Topics to be covered include monads, type and constructor classes, functional/persistent data structures, advanced topics in type systems, program analysis techniques, program transformation. **PREREQS:** CS 581

CS 584. HUMAN FACTORS PROGRAMMING LANGUAGES (4). Principles and evaluation methods for designing and evaluating programming languages to emphasize human productivity. Overall goals are (a) to enable students to understand and apply these principles and methods, and (b) to introduce at least four programming languages that aim specifically at supporting human problem solving. **PREREQS:** Graduate standing in computer science or instructor approval required.

CS 589. SELECTED TOPICS IN PROGRAMMING LANGUAGES (1-5). An in-depth examination of a specific topic of interest in programming language design and implementation. Example topics include object-oriented programming, parallel programming, compiler optimization, programming language semantics. This course is repeatable for a maximum of 99 credits.

CS 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

CS 601. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 99 credits. **PREREQS:** Departmental approval required.

CS 603. CS PhD THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Instructor's consent required.

CS 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

CS 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

■ ELECTRICAL AND COMPUTER ENGINEERING COURSES

ECE 111. INTRODUCTION TO ECE: TOOLS (3). Introduction to the electrical and computer engineering professional practice. Covers the foundations of engineering problem solving and other skills necessary for success. Students will be taught engineering practice through hands-on approaches. Recommended for electrical and computer engineering majors, and for those interested in engineering as a profession. Lec/lab. Has extra fees. **PREREQS:** MTH 111 recommended (concurrent OK if needed)

ECE 112. INTRODUCTION TO ECE: CONCEPTS (3). Basic electrical and computer engineering concepts, problem solving and hands-on laboratory project. Topics include electronic circuit and device models, digital logic, circuit analysis, and simulation tools. Lec/lab. Has extra fees. **PREREQS:** (MTH 111 or MTH 112 or MTH 251 or MTH 251H) or Placement Test

ECE 151. INTRODUCTION TO PROGRAMMING I WITH EMBEDDED CONTROL LAB (4). Thorough treatment of the basic elements of C, bitwise operations, flow of control, input/output, functions, arrays, strings, and structures. Lec/lab. **CROSSLISTED** as CS 151. **PREREQS:** (MTH 111 or MTH 112 or MTH 251 or MTH 251H) or Placement Test

ECE 152. INTRODUCTION TO PROGRAMMING II WITH EMBEDDED CONTROL LAB (4). Control using microcontrollers with the C language. Interfacing to PCs using on Object Oriented Programming language. Lec/lab. **PREREQS:** ((ECE 151 or CS 151) and MTH 231*)

ECE 199. SPECIAL STUDIES (1-16). One-credit section. Graded P/N. This course is repeatable for a maximum of 16 credits.

ECE 271. DIGITAL LOGIC DESIGN (3). A first course in digital logic design. Data types and representations, Boolean algebra, state machines, simplification of switching expressions, and introductory computer arithmetic. Lec/rec. **PREREQS:** (MTH 251* or MTH 251H* or MTH 231*)

ECE 272. DIGITAL LOGIC DESIGN LABORATORY (1). Laboratory to accompany ECE 271, Digital Logic Design. Illustrates topics covered in the lectures of ECE 271 using computer-aided design, verification tools, and prototyping hardware. Lec/lab. **PREREQS:** ((ECE 112 or ENGR 201) and ECE 271*)

ECE 322. ELECTRONICS I (4). Fundamental device characteristics including diodes, MOSFETs and bipolar transistors; small- and large-signal characteristics and design of linear circuits. Lec/lab. **PREREQS:** ENGR 203

ECE 323. ELECTRONICS II (4). Transient operation of MOSFETs and bipolar transistors; multistage amplifiers; frequency response; feedback and stability. Lec/lab. **PREREQS:** ECE 322

ECE 331. ELECTROMECHANICAL ENERGY CONVERSION (4). Voltage generation and energy conversion principles for electric motors. Steady-

state characteristics of induction, synchronous and direct machines. Magnetic circuits. Lec/lab. **PREREQS:** ((ENGR 202 or ENGR 202H) and ECE 390) and (ENGR 211 or ENGR 211H)

ECE 351. SIGNALS AND SYSTEMS I (3). Analytical techniques for continuous-time and discrete-time signal, system, and circuit analysis. Lec. **PREREQS:** (ENGR 203 and (MTH 256 or MTH 256H))

ECE 352. SIGNALS AND SYSTEMS II (4). Analytical techniques for continuous-time and discrete-time signal, system, and circuit analysis. Lec/lab. **PREREQS:** (ECE 351 and (MTH 306 or MTH 306H))

ECE 353. INTRODUCTION TO PROBABILITY AND RANDOM SIGNALS (3). Introductory discrete and continuous probability concepts, single and multiple random variable distributions, expectation, introductory stochastic processes, correlation and power spectral density properties of random signals, random signals through linear filters. Lec. **PREREQS:** ((MTH 254 or MTH 254H) and ECE 351)

ECE 372. INTRODUCTION TO COMPUTER NETWORKS (4). Computer network principles, fundamental networking concepts, packet-switching and circuit-switching, TCP/IP protocol layers, reliable data transfer, congestion control, flow control, packet forwarding and routing, MAC addressing, multiple access techniques. Lec. **CROSSLISTED** as CS 372. **PREREQS:** CS 261 and (ECE 271 or CS 271) and C programming and Unix familiarity.

ECE 375. COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING (4). Introduction to computer organization, how major components in a computer system function together in executing a program, and assembly language programming. Lec/lab. **PREREQS:** ECE 271 and C/C++ programming (e.g. CS 261).

ECE 390. ELECTRIC AND MAGNETIC FIELDS (4). Static and quasi-static electric and magnetic fields. **PREREQS:** ((MTH 255 or MTH 255H) and ENGR 203*)

ECE 391. TRANSMISSION LINES (3). Transient and steady-state analysis of transmission line circuits with application to engineering problems. **PREREQS:** (ENGR 203 and (MTH 254 or MTH 254H) and (MTH 256 or MTH 256H) and ECE 322*)

ECE 399. SPECIAL TOPICS (1-16). Course work to meet students' needs in advanced or specialized areas and to introduce new, important topics in electrical and computer engineering at the undergraduate (junior/senior) level. This course is repeatable for a maximum of 16 credits.

ECE 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECE 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECE 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECE 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECE 410. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECE 411. ENGINEERING MAGNETICS (3). Application of magnetic materials in the design of magnetic devices. Properties of magnetic materials; engineering design of actuators, sensors and data storage devices. Introduction to spintronics. **PREREQS:** ECE 390

ECE 413. SENSORS (3). Overview of sensor technologies including materials, physics of

operation, applications and system integration.

PREREQS: (ECE 322 and ECE 323)

ECE 415. MATERIAL SCIENCE OF NANOTECHNOLOGY (3).

Introductory physical chemistry of solid surfaces, thermodynamics, and kinetics applied to synthesis of nanomaterials such as nanoparticles, nanowires, thin films, carbon nanotubes, fullerenes, graphene, etc. Characterization of nanomaterials, applications of nanomaterials, nano-synthesis techniques, integration of nanotechnology, and emerging nanotechnology topics. **PREREQS:** (ECE 317 or ECE 416 or ENGR 321 or ENGR 321H)

ECE 416. ELECTRONIC MATERIALS AND DEVICES (4).

Semiconductor fundamentals and physical principles of pn junctions and Schottky barrier diodes. **PREREQS:** ENGR 201

ECE 417. BASIC SEMICONDUCTOR DEVICES (4).

Theory and physical principles of bipolar junction and field-effect transistors. Lec/rec. **PREREQS:** (ECE 317 or ECE 416)

ECE 418. SEMICONDUCTOR PROCESSING (4).

Theory and practice of basic semiconductor processing techniques. Introduction to process simulation. Lec/lab/rec. **PREREQS:** (ECE 317 or ECE 416) and/or equivalent.

ECE 422. CMOS INTEGRATED CIRCUITS I (4).

Analysis and design of analog integrated circuits in CMOS technology; current mirrors, gain stages, single-ended operational amplifier, frequency response, and compensation. **PREREQS:** (ECE 322 and ECE 323*)

ECE 423. CMOS INTEGRATED CIRCUITS II (4).

Analysis and design of analog integrated circuits in CMOS technology; cascaded current mirrors, cascaded gain stages, single-ended and fully differential operational amplifier, common-mode feedback, noise, and distortion. Lec/lab. **PREREQS:** ECE 422

ECE 428. DATA CONVERTERS (4).

The functions, characterization, algorithms, architectures and implementation of A/D and D/A data converters. Lec/lab. **PREREQS:** (ECE 323 and ECE 352)

ECE 431. POWER ELECTRONICS (4).

Fundamentals and applications of devices, circuits and controllers used in systems for electronic power processing. Lec/lab. **PREREQS:** (ECE 322 and ECE 323* and ECE 351)

ECE 432. DYNAMICS OF ELECTROMECHANICAL ENERGY CONVERSION (4).

Generalized machine theory. Techniques for dynamic analysis of electromechanical machines: dq representations of machines. Lec/lab. **PREREQS:** ECE 331 and (ENGR 212 or ENGR 212H)

ECE 433. POWER SYSTEMS ANALYSIS (4).

Fundamentals and control of real and reactive power, steady-state load flow studies, unbalance, stability and transient system analysis. **PREREQS:** (ECE 323 and ECE 352) and three-phase power

ECE 438. ELECTRIC AND HYBRID VEHICLES (4).

History of electric traction. Introduction to electric and hybrid-electric vehicle configurations. Vehicle mechanics. Energy sources and storage. Range prediction. Motors for HEVs. Electric drive components. Vehicle transmission systems. Lec. Taught alternate years. **PREREQS:** ((ENGR 202 or ENGR 202H) and (ENGR 212 or ENGR 212H))

ECE 441. ^ENGINEERING DESIGN PROJECT (3).

First term of an extended, 3-term team design project to expose students to problem situations and issues in engineering design similar to those encountered in industry. (Writing Intensive Courses) **PREREQS:** (ECE 322 and ECE 351) and senior standing in ECE.

ECE 442. ^ENGINEERING DESIGN PROJECT (3).

Second term of an extended, 3-term team design project to expose students to problem situations and issues in engineering design similar

to those encountered in industry. (Writing Intensive Courses) **PREREQS:** ECE 441

ECE 443. ^ENGINEERING DESIGN PROJECT (2).

An extended team design project to expose students to problem situations and issues in engineering design similar to those encountered in industry. (Writing Intensive Courses) **PREREQS:** ECE 442 and senior standing in electrical or computer engineering.

ECE 451. SYSTEMS DYNAMICS AND CONTROL (4).

Modeling and analysis of linear continuous systems in time and frequency domains. Fundamentals of single-input-single-output control system design. CROSSLISTED as ME 430. **PREREQS:** (ME 317 or (ECE 351 and ECE 352 and (ENGR 212 or ENGR 212H))

ECE 461. INTRODUCTION TO ANALOG AND DIGITAL COMMUNICATIONS (4).

Fundamental concepts of analog and digital telecommunication systems: modeling, analysis, and design of analog amplitude and angle modulation systems; probabilistic performance assessment of modulated signals over noisy channels; introduction to baseband digital modulation techniques such as binary pulse amplitude modulation and pulse position modulation and their demodulation in the presence of random noise. Lec. **PREREQS:** (ECE 351 and ECE 352 and ECE 353)

ECE 462. DIGITAL COMMUNICATIONS AND CHANNEL CODING (4).

Modeling, analysis, design of baseband and passband digital communications systems: geometric representation of signals; correlator receivers for M-ary digital communications systems; decision theory and its application to digital communication systems in additive white Gaussian noise environment; generation, transmission, and reception of passband digital modulated signals (BPSK, QPSK, FSK PAM); basics of information theory and channel encoding. Lec. **PREREQS:** (ECE 461 and ECE 351 and ECE 352 and ECE 353)

ECE 463. WIRELESS COMMUNICATIONS NETWORK (4).

Wireless networks: personal area (IEEE 802.15.4a), local area (IEEE 802.11), metropolitan area (IEEE 802.16), and mobile cellular networks (e.g., CDMA); physical-layer techniques for data modulation and multiple access; RF system engineering aspects of mobile cellular networks (e.g., RF coverage for a certain propagation environment.) Lec. **PREREQS:** (ECE 351 and ECE 352) and probability background. Recommended: ECE 461.

ECE 464. DIGITAL SIGNAL PROCESSING (4).

Analysis and design of discrete-time linear-time invariant systems for processing discrete-time signals: DT-LTI system properties, DT signal analysis using Discrete-Time Fourier Transform, Discrete Fourier Transform and z-Transform, frequency response and transfer function. Signal sampling and reconstruction, digital processing of continuous-time signals, FIR and IIR digital filter design, and filter structures. **PREREQS:** (ECE 351 and ECE 352)

ECE 468. DIGITAL IMAGE PROCESSING (3).

Introduction to digital image processing including fundamental concepts of visual perception, image sampling and quantization, image enhancement in spatial and frequency domains (through 2D Fourier transform), image restoration, and color image processing. Implementation of algorithms using Matlab Image Processing Toolbox. **PREREQS:** (ECE 351 and ECE 352)

ECE 471. ENERGY-EFFICIENT VLSI DESIGN (4).

Combinational and sequential logic design using CMOS transistors; analysis of power consumption and logic delay of digital logic; clock design including skew, jitter, and dynamic clock energy consumption; supply voltage and power supply noise sources; dynamic voltage frequency scaling (DVFS); sub-threshold logic design and effect on energy/robustness;

custom digital integrated circuit design including transistor layouts and CAD entry; CMOS scaling and the effect on process variability and power consumption. Lec/lab. **PREREQS:** (ECE 271 and ECE 322 and ECE 323*)

ECE 472. COMPUTER ARCHITECTURE (4).

Computer architecture using processors, memories, and I/O devices as building blocks. Issues involved in the design of instruction set architecture, processor, pipelining, and memory organization. Design philosophies and trade-offs involved in Reduced Instruction Set Computer (RISC) architectures. Lec/lab. CROSSLISTED as CS 472/CS 572. **PREREQS:** ECE 375

ECE 473. MICROPROCESSOR SYSTEM DESIGN (4).

Implementation of embedded computer systems focusing on the development of hardware and software for an embedded RISC microcontroller system. Topics include internal microcontroller architecture, interfacing peripheral devices, mixed analog and digital systems, and hardware and software implementation of several systems using an 8-bit microcontroller and peripherals. **PREREQS:** (ECE 322 and ECE 375 and CS 261)

ECE 474. VLSI SYSTEM DESIGN (4).

Introduction to custom and semi-custom digital integrated circuit design as used in VLSI systems. The use of CAD/CAE tools, design management, and design methodology are introduced. **PREREQS:** (ECE 322 and ECE 375)

ECE 476. ADVANCED COMPUTER NETWORKING (4).

Advanced networking concepts: congestion control and avoidance, multimedia and QoS, queuing theory, buffer management, scheduling and fairness policies, wireless and mobile networks, service models, network security. CROSSLISTED as CS 476/CS 576. **PREREQS:** (CS 372 or ECE 372)

ECE 477. MULTIMEDIA SYSTEMS (4).

Design of multimedia systems used in information technology covering the hardware, software, applications, and networks. Components covered include multimedia representation, coding and compression techniques, wireless networks, networking for multimedia, and embedded system for multimedia. Lec. **PREREQS:** ECE 375

ECE 478. NETWORK SECURITY (4).

Security principles, models, and attacks. Overview of cryptography. Building secure systems and security evaluation criteria. Security in operating systems and computer networks. Management and analysis of security. Legal and ethical issues in computer security.

ECE 482. OPTICAL ELECTRONIC SYSTEMS (4).

Photodetectors, laser theory, and laser systems. Lec/lab. CROSSLISTED as PH 482/PH 582. **PREREQS:** ECE 391 or (PH 481 or PH 581) or equivalent.

ECE 483. GUIDED WAVE OPTICS (4).

Optical fibers, fiber mode structure and polarization effects, fiber interferometry, fiber sensors, optical communication systems. Lec/lab. CROSSLISTED as PH 483/PH 583. **PREREQS:** (ECE 391* or PH 481*)

ECE 484. ANTENNAS AND PROPAGATION (4).

Introduction to antennas and radiowave propagation. Offered alternate years. **PREREQS:** (ECE 390 and ECE 391) and/or equivalent.

ECE 485. MICROWAVE DESIGN TECHNIQUES (4).

Introduction to basic design techniques required for the design of high-frequency circuits and systems. Lec/Lab. **PREREQS:** (ECE 390 and ECE 391) and/or equivalent.

ECE 499. SPECIAL TOPICS (1-16).

Course work to meet students' needs in advanced or specialized areas and to introduce new important topics in electrical and computer engineering at the undergraduate level. This course is repeatable for a maximum of 16 credits.

ECE 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECE 503. ECE MS THESIS (1-16). This course is repeatable for a maximum of 999 credits.

ECE 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECE 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECE 507. SEMINAR (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Graduate standing.

ECE 511. ELECTRONIC MATERIALS PROCESSING (3). Technology, theory, and analysis of processing methods used in integration circuit fabrication. Offered alternate years. **PREREQS:** Graduate standing or instructor approval required.

ECE 516. ELECTRONIC MATERIALS AND DEVICES (4). Semiconductor fundamentals and physical principles of pn junctions and Schottky barrier diodes. **PREREQS:** ENGR 201

ECE 517. BASIC SEMICONDUCTOR DEVICES (4). Theory and physical principles of bipolar junction and field-effect transistors. Lec/rec. **PREREQS:** ECE 317 or ECE 416

ECE 518. SEMICONDUCTOR PROCESSING (4). Theory and practice of basic semiconductor processing techniques. Introduction to process simulation. Lec/lab/rec. **PREREQS:** ECE 317 or ECE 416 or equivalent.

ECE 520. ANALOG CMOS INTEGRATED CIRCUITS (4). Principles and techniques of design of electronic circuits with focus on a design methodology for analog integrated circuits. Practical aspects of using CAD tools in analyzing and laying out circuits will be discussed.

ECE 521. ANALOG CIRCUIT SIMULATION (4). Formulation/solution of circuit equations; sparse matrix techniques; DC, transient, sensitivity, noise and Fourier analyses; RF circuit simulation. **PREREQS:** ECE 423 or ECE 520

ECE 522. CMOS INTEGRATED CIRCUITS I (4). Analysis and design of analog integrated circuits in CMOS technology; current mirrors, gain stages, single-ended operational amplifier, frequency response, and compensation. **PREREQS:** ECE 322 and ECE 323*

ECE 523. CMOS INTEGRATED CIRCUITS II (4). Analysis and design of analog integrated circuits in CMOS technology; cascaded current mirrors, cascaded gain stages, single-ended and fully differential operational amplifier, common-mode feedback, noise, and distortion. Lec/lab. **PREREQS:** ECE 422 or ECE 522

ECE 528. DATA CONVERTERS (4). The functions, characterization, algorithms, architectures and implementation of A/D and D/A data converters. Lec/lab. **PREREQS:** ECE 323 and ECE 352

ECE 530. CONTEMPORARY ENERGY APPLICATIONS (4). Contemporary energy issues and applications; fundamental physics of renewable energy sources (e.g. wind, wave, and solar), devices used to harvest energy from these sources, state-of-the-art renewable energy technology, power transmission, transformers, and energy storage. **PREREQS:** Graduate standing in engineering; Matlab, basic circuit analysis with RLC components and diodes.

ECE 531. POWER ELECTRONICS (4). Fundamentals and applications of devices, circuits and controllers used in systems for electronic power processing. Lec/lab. **PREREQS:** ECE 322 and ECE 323* and ECE 351

ECE 532. DYNAMICS OF ELECTROMECHANICAL ENERGY CONVERSION (4). Generalized machine theory. Techniques for dynamic analysis of electromechanical machines: dq representations of machines. Lec/lab. **PREREQS:** (ENGR 212 or ENGR 212H)

ECE 533. POWER SYSTEMS ANALYSIS (4). Fundamentals and control of real and reactive power, steady-state load flow studies, unbalance, stability and transient system analysis. **PREREQS:** ECE 323 and ECE 352 and three-phase power

ECE 534. ADVANCED ELECTRICAL MACHINES (3). Development of models for the dynamic performance of all classes of electrical machines; synchronous, induction, permanent magnet and reluctance motors. Dynamic motor simulations. **PREREQS:** ECE 530

ECE 535. ADJUSTABLE SPEED DRIVES AND MOTION CONTROL (3). Adjustable speed drives, associated power electronic converters, simulation and control. Lec. **PREREQS:** ECE 530

ECE 538. ELECTRIC AND HYBRID VEHICLES (4). History of electric traction. Introduction to electric and hybrid-electric vehicle configurations. Vehicle mechanics. Energy sources and storage. Range prediction. Motors for HEVs. Electric drive components. Vehicle transmission systems. Lec. Taught alternate years. **PREREQS:** ENGR 202 and ENGR 212

ECE 550. LINEAR SYSTEMS (4). Linear dynamic systems theory and modeling. **PREREQS:** ECE 351 and ECE 352 or equivalent

ECE 560. STOCHASTIC SIGNALS AND SYSTEMS (4). Stochastic processes, correlation functions, spectral analysis applicable to communication and control systems. **PREREQS:** ECE 461 or ECE 561

ECE 561. INTRODUCTION TO ANALOG AND DIGITAL COMMUNICATIONS (4). Fundamental concepts of analog and digital telecommunication systems: modeling, analysis, and design of analog amplitude and angle modulation systems; probabilistic performance assessment of modulated signals over noisy channels; introduction to baseband digital modulation techniques such as binary pulse amplitude modulation and pulse position modulation and their demodulation in the presence of random noise. Lec. **PREREQS:** ECE 351 and ECE 352 and ECE 353

ECE 562. DIGITAL COMMUNICATIONS AND CHANNEL CODING (4). Modeling, analysis, design of baseband and passband digital communications systems: geometric representation of signals; correlator receivers for M-ary digital communications systems; decision theory and its application to digital communication systems in additive white Gaussian noise environment; generation, transmission, and reception of passband digital modulated signals (BPSK, QPSK, FSK PAM); basics of information theory and channel encoding. Lec. **PREREQS:** ECE 461 and ECE 351 and ECE 352 and ECE 353

ECE 563. WIRELESS COMMUNICATIONS NETWORK (4). Wireless networks: personal area (IEEE 802.15.4a), local area (IEEE 802.11), metropolitan area (IEEE 802.16), and mobile cellular networks (e.g., CDMA); physical-layer techniques for data modulation and multiple access; RF system engineering aspects of mobile cellular networks (e.g., system capability for voice and packet data traffics, RF coverage for a certain propagation environment.) Lec. **PREREQS:** Probability background. Recommended: ECE 461

ECE 564. DIGITAL SIGNAL PROCESSING (4). Analysis and design of discrete-time linear-time invariant systems for processing discrete-time signals: DT-LTI system properties, DT signal analysis using Discrete-Time Fourier Transform, Discrete Fourier Transform and z-Transform,

frequency response and transfer function. Signal sampling and reconstruction, digital processing of continuous-time signals, FIR and IIR digital filter design, and filter structures. **PREREQS:** ECE 351 and ECE 352

ECE 565. ESTIMATION, FILTERING, AND DETECTION (4). Principles of estimation, linear filtering, and detection. **PREREQS:** ECE 353 or equivalent.

ECE 566. INFORMATION THEORY (4). Introduction to information theory: entropy, differential entropy, entropy rates, mutual information, data compression, channel capacity, source coding, channel coding, network information theory. **PREREQS:** ECE 353 or equivalent; strong mathematical background.

ECE 567. DIGITAL SIGNAL PROCESSING (3). Advanced methods in signal processing, optimum filter design, decimation and interpolation methods, quantization error effects, spectral estimation. **PREREQS:** ECE 464 or ECE 564 or instructor approval required

ECE 568. ADVANCED DIGITAL IMAGE PROCESSING (3). Advanced topics in digital image processing including wavelet and multi-resolution image processing, image compression, image segmentation, image representation and description, and object recognition. Implementation of digital image processing algorithms using Matlab Image Processing Toolbox. **PREREQS:** ECE 468 or CS 555

ECE 570. HIGH PERFORMANCE COMPUTER ARCHITECTURE (4). Advanced concepts in computer architecture. Performance improvement employing advanced pipelining and multiple instruction scheduling techniques. Issues in memory hierarchy and management. CROSSLISTED as CS 570. **PREREQS:** ECE 472 or ECE 572

ECE 571. ENERGY-EFFICIENT VLSI DESIGN (4). Combinational and sequential logic design using CMOS transistors; analysis of power consumption and logic delay of digital logic; clock design including skew, jitter, and dynamic clock energy consumption; supply voltage and power supply noise sources; dynamic voltage frequency and scaling (DVFS); sub-threshold logic design and effect on energy/robustness; custom digital integrated circuit design including transistor layouts and CAD entry; CMOS scaling and the effect on process variability and power consumption. Lec/lab. **PREREQS:** ECE 271 and ECE 323 and ECE 323 with a minimum grade of C.

ECE 572. COMPUTER ARCHITECTURE (4). Computer architecture using processors, memories, and I/O devices as building blocks. Issues involved in the design of instruction set architecture, processor, pipelining, and memory organization. Design philosophies and trade-offs involved in Reduced Instruction Set Computer (RISC) architectures. Lec/lab. CROSSLISTED as CS 472/CS 572. **PREREQS:** ECE 375

ECE 573. MICROPROCESSOR SYSTEM DESIGN (4). Implementation of embedded computer systems focusing on the development of hardware and software for an embedded RISC microcomputer system. Topics include internal microcomputer architecture, interfacing peripheral devices, mixed analog and digital systems, and hardware and software implementation of several systems using an 8-bit microcomputer and peripherals. **PREREQS:** ECE 322 and ECE 375 and CS 261

ECE 574. VLSI SYSTEM DESIGN (4). Introduction to custom and semi-custom digital integrated circuit design as used in VLSI systems. The use of CAD/CAE tools, design management, and design methodology are introduced. **PREREQS:** ECE 322 or ECE 375

ECE 575. DATA SECURITY AND CRYPTOGRAPHY (3). Secret-key and public-key cryptography, authentication and digital signatures, protocols, implementation issues, privacy enhanced mail, data and communication security standards. **PREREQS:** Graduate standing.

ECE 576. ADVANCED COMPUTER NETWORKING (4). Advanced networking concepts: congestion control and avoidance, multimedia and QoS, queuing theory, buffer management, scheduling and fairness policies, wireless and mobile networks, service models, network security. **CROSSLISTED** as CS 476/CS 576. **PREREQS:** CS 372 or ECE 372

ECE 577. MULTIMEDIA SYSTEMS (4). Design of multimedia systems for information technology covering the hardware, software, applications, and networks. Components covered include multimedia representation, coding and compression techniques, wireless networks, networking for multimedia, and embedded system for multimedia. Lec. **PREREQS:** ECE 375

ECE 580. NETWORK THEORY (4). Linear graphs, multiport networks, and other topics in advanced network theory. **PREREQS:** Graduate standing in ECE.

ECE 582. OPTICAL ELECTRONIC SYSTEMS (4). Photodetectors, laser theory, and laser systems. Lec/lab. **CROSSLISTED** as PH 482/PH 582. **PREREQS:** (PH 481 or PH 581) or equivalent

ECE 583. GUIDED WAVE OPTICS (4). Optical fibers, fiber mode structure and polarization effects, fiber interferometry, fiber sensors, optical communication systems. Lec/lab. **CROSSLISTED** as PH 483/PH 583. **PREREQS:** (ECE 391* or PH 481* or PH 581*)

ECE 584. ANTENNAS AND PROPAGATION (4). Introduction to antennas and radiowave propagation. Offered alternate years.

ECE 585. MICROWAVE DESIGN TECHNIQUES (4). Introduction to basic design techniques required for the design of high-frequency circuits and systems. Lec/Lab.

ECE 590. ANALYTICAL TECHNIQUES IN ELECTROMAGNETIC FIELDS (4). Basic analytical techniques required to solve meaningful field problems in engineering. **PREREQS:** Graduate standing in ECE.

ECE 591. ADVANCED ELECTROMAGNETICS (3). Advanced techniques for analyzing problems in electromagnetics, primarily numerical. Offered alternate years. **PREREQS:** ECE 590

ECE 592. ADVANCED OPTOELECTRONICS (3). Principles of quantum exchange devices, field-material interaction and theory, and applications of optical circuits and devices. Offered alternate years. **PREREQS:** (ECE 482 or ECE 582) and ECE 590

ECE 593. RF MICROWAVE CIRCUIT DESIGN (3). Active/passive RF and microwave circuit design with emphasis to wireless systems. **PREREQS:** ECE 390 and ECE 391 or equivalent

ECE 599. SPECIAL TOPICS (1-16). Course work to meet students' needs in advanced or specialized areas and to introduce new important topics in electrical and computer engineering at the undergraduate level. This course is repeatable for a maximum of 16 credits.

ECE 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECE 603. ECE PhD THESIS (1-16). This course is repeatable for a maximum of 999 credits.

ECE 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECE 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECE 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

ECE 611. ELECTRONIC MATERIALS PROCESSING (3). Technology, theory, and analysis of processing methods used in integration circuit fabrication. Offered alternate years. **CROSSLISTED** as CHE 611. **PREREQS:** Graduate standing or instructor approval.

ECE 612. PROCESS INTEGRATION (3). Process integration, simulation, and statistical quality control issues related to integrated circuit fabrication. Offered alternate years. **CROSSLISTED** as CHE 612. **PREREQS:** ECE 611 or CHE 611 or instructor approval.

ECE 613. ELECTRONIC MATERIALS AND CHARACTERIZATION (3). Physics and chemistry of electronic materials and methods of materials characterization. Offered alternate years. **CROSSLISTED** as CHE 613. **PREREQS:** Graduate standing or instructor approval.

ECE 614. SEMICONDUCTORS (3). Essential aspects of semiconductor physics relevant for an advanced understanding of semiconductor materials and devices. Offered alternate years. **PREREQS:** Exposure to quantum mechanics and solid state physics.

ECE 615. SEMICONDUCTOR DEVICES I (3). Advanced treatment of two-terminal semiconductor electronic devices. Offered alternate years. **PREREQS:** Graduate standing or instructor approval; ECE 614 recommended.

ECE 616. SEMICONDUCTOR DEVICES II (3). Advanced treatment of three-terminal semiconductor electronic devices. Offered alternate years. **PREREQS:** ECE 615 or instructor approval.

ECE 619. SELECTED TOPICS IN SOLID STATE (3). Special courses taught on various topics in solid state as interests and demands vary. This course is repeatable for a maximum of 99 credits.

ECE 621. RADIO FREQUENCY IC DESIGN (3). Radio frequency (RF) circuits. Principles, analysis, and design of bipolar and MOS RF IC building blocks: low noise amplifiers, mixers, oscillators, frequency synthesizers. **PREREQS:** (ECE 422 or ECE 522) and (ECE 423 or ECE 523) or ECE 520

ECE 626. ANALOG CMOS CIRCUIT DESIGN (3). Switched-capacitor circuit design, on-chip filters, data converters. Practical aspects of analog CMOS IC design.

ECE 627. OVERSAMPLED DELTA-SIGMA DATA CONVERTERS (3). Noise-shaping theory in first, second, and higher-order modulators. Design, simulation, and realization in hardware of converters using this popular architecture.

ECE 659. SELECTED TOPICS IN SYSTEMS AND CONTROL (3). Course work to meet students' needs in advanced or specialized areas and to introduce the newest important results in systems and control. This course is repeatable for a maximum of 18 credits. **PREREQS:** Graduate standing in ECE.

ECE 662. COMMUNICATION SYSTEMS--CODING AND INFORMATION THEORY (3). Various aspects of information theory, with particular emphasis on the coding process; data compression problems, and the development of rate distortion theory. **PREREQS:** (ECE 462 or ECE 562) and ECE 560

ECE 669. SELECTED TOPICS IN COMMUNICATIONS AND SIGNAL PROCESSING (3). Course work to meet students' needs in advanced or specialized areas and to introduce the newest important results in signal processing. This course is repeatable for a maximum of 18 credits. **PREREQS:** Graduate standing in ECE.

ECE 679. SELECTED TOPICS IN COMPUTER ENGINEERING (1-16). Topics to be presented at various times include information storage and retrieval, computer architecture, fault-tolerant computing, asynchronous sequential circuits, automata, data transmission, coding theory. This course is repeatable for a maximum of 99 credits. **PREREQS:** Graduate standing in ECE.

ECE 699. SPECIAL TOPICS (3). Advanced studies in field and wave theories and special devices. Topic examples are microwave and acoustic devices, advanced lasers and masers, electron beam interactions with traveling waves, MHD device dynamics. This course is repeatable for a maximum of 99 credits. **PREREQS:** Graduate standing in ECE.

SCHOOL OF MECHANICAL, INDUSTRIAL, AND MANUFACTURING ENGINEERING

EAC/ABET Accredited

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David P. Cann, Associate Head for
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FACULTY

Professors Batten, Campbell, Cann, Doolen, Liburdy, Logendran, Paasch, B. Paul, Pence, Stone, I. Tumer, K. Tumer
Associate Professors Albertini, Apte, Atre, Bay, Funk, Gibbons, Grimm, Kim, Kruzic, Narayanan, Porter, Sharp, Smart, Warnes

Assistant Professors

Balasubramanian, Blunck, Calvo, DuPont, Eseonu, Feuerbacher, Greaney, Haapala, Hagen, Hatton, Hollinger, Hoyle, Hurst, Malhotra, Parmigiani, Tucker, Vergara

PROFESSIONAL FACULTY

Barber, Borntrager, DeAdder, Finn, Helvie, Jensen, McAllister, G. Newcomb, L. Paul, J. Robinson, T.A. Robinson, White

Undergraduate Majors

Energy Systems Engineering (BS, HBS)
 [OSU-Cascades/COCC only]
Industrial Engineering (BS, CRED, HBS)

Option
Business Engineering

Manufacturing Engineering
 (BS, CRED, HBS)

Mechanical Engineering (BS, CRED, HBS)

Graduate Majors

Industrial Engineering
 (MAIS, MEng, MS, PhD)

Option
Engineering Management

Graduate Areas of Concentration
Human Systems Engineering
Information Systems Engineering
Manufacturing Systems Engineering
Nano/Micro Fabrication

Materials Science (MS, PhD)

Graduate Areas of Concentration
Chemistry
Chemical Engineering
Civil Engineering
Electrical and Computer Engineering

Forest Products
Mathematics
Mechanical Engineering
Nuclear Engineering
Physics

Mechanical Engineering (MEng, MS, PhD)

Options
Design
Materials Mechanics
Robotics
Thermal Fluids

Graduate Areas of Concentration

Applied Mechanics
Applied Thermodynamics
Biomechanics
Combustion
Design
Design and Analysis of Mechanical and Thermal Fluid Systems
Dynamics
Energy
Fluid Mechanics
Heat Transfer
Materials Science
Mechanical Engineering
Physical and Mechanical Metallurgy
Solid Mechanics
Stress Analysis
Systems and Control

Graduate Minors

Industrial Engineering
Mechanical Engineering

The School of Mechanical, Industrial, and Manufacturing Engineering (MIME) at OSU offers three ABET-accredited undergraduate degrees: Mechanical Engineering, Industrial Engineering, and Manufacturing Engineering.

The mission of the School of MIME is two-fold:

- To prepare our students as entrepreneurial, team-oriented, work-ready graduates and lifelong learners in mechanical, industrial and manufacturing engineering, and
- To engage in collaborative, cutting-edge research whose applications lead to greater prosperity and a sustainable future for Oregon and the world.

MIME PROGRAM OBJECTIVES

ABET requires that each program establish educational objectives defined as “broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.” The three broad areas of student participation and graduate achievement on which all MIME programs focus, and the specific educational objectives associated with each of these three areas are:

1. **Our graduates will be systems thinkers.** MIME graduates will be able to analyze, evaluate, improve, and design engineered systems and processes using modern engineering tools (hardware and software) and approaches. They will demonstrate in-depth knowledge of mechanical, industrial and/or manufacturing systems.
2. **Our graduates will be global collaborators.** MIME graduates will be able to communicate effectively across disciplines and cultures. They will provide management and leadership skills within their organizations and work effectively in diverse environments.
3. **Our graduates will be innovative designers and problem solvers.** MIME graduates will use both structured and unstructured methodologies to innovate systems and processes. They will apply technical knowledge and creativity in solving real-world problems. They will demonstrate sound understanding of engineering and project management fundamentals and breadth of experience with engineering design and problem-solving processes.

MECHANICAL ENGINEERING

Mechanical engineers design and develop small devices, large equipment and processes for society. They play major roles in the design, testing and operation of mechanisms, machines, and systems, including processes for energy conversion and equipment used in households, businesses, transportation and manufacturing.

In addition to the university baccalaureate core, the mechanical engineering curriculum has its base in mathematics, science, engineering science, and design. Mathematics and science courses occur primarily in the first two years. Engineering science is a major component, which is treated from the sophomore year to graduation in a combination of required and technical elective sources.

OSU’s Mechanical Engineering Program has all the attributes needed for the best learning environment: ABET accredited curriculum, excellent faculty, modern facilities, quality students, and strong industrial interaction.

Engineering design is an integral element of the program. The philosophy is to “plant the seed” for design at the freshman level and grow it throughout the program. Most of the skills are developed at the junior and senior levels, when students have achieved proficiency in the basic technical requirements. At the junior level, the design process is extensively developed in three courses. At the senior year, design experiences occur

in several areas, culminating in the two-term senior project in which students in small teams carry out the design of some product or process under the supervision of a faculty advisor. Attention to hands-on activity adds a very desirable “feel” for many aspects of the design process.

A good choice of senior electives enables students to achieve a degree of specialization and depth to match their interests. The areas include applied stress analysis; design, dynamics and analysis of mechanical and thermal/fluid systems; concurrent engineering; control system design; mechatronics; heat transfer; and metallurgy and materials.

The faculty encourages a vibrant extracurricular program for professional and leadership experiences. Students are encouraged to obtain at least three months of work experience through an industrial or research internship or to participate in a foreign exchange program. The school’s goal is to have more than 95 percent of its students graduate with such experience. In addition to students having general internships, many of the professional-level students participate in the industry-driven Multiple Engineering Cooperative Program (MECOP). This program provides two paid six-month internships at over 60 Pacific Northwest companies where interns work with a company mentor and improve their capabilities for the work environment.

Mechanical engineers can be found in a wide variety of industries including aerospace, electronics, biomedical, transportation, manufacturing, energy, automotive, and government labs. Because of the increasing complexity of mechanical engineering, graduate study for the MS and PhD degrees is advisable for students who wish to specialize in depth in any of the above areas. The undergraduate curriculum provides an excellent foundation for graduate study.

INDUSTRIAL ENGINEERING

Industrial engineers (IEs) apply science, mathematics, and engineering methods to complex system integration and operation. Because the systems with which they work are often large and complex, IEs utilize knowledge and skills in a wide variety of disciplines, have the ability to work well with people, and take a broad, systems perspective. The Industrial Engineering degree is a very flexible degree that allows students to tailor their program of study to meet their individual career goals. A large number of restricted elective credits allows students to pursue the Business Engineering option or to customize their program to a field of interest.

IEs are key players in the integration and operation of systems in all sectors of industry and government including the following (with examples):

- aerospace (NASA space shuttle pre-launch processing systems)
- automotive (automobile final assembly plants)
- communications (telephone services)
- computers (factory information systems)
- electronics/semiconductors (silicon wafer fabrication facilities)
- food (canneries and fast food restaurant chains)
- government (department of motor vehicles service centers)
- health care (hospital central stores and operating rooms)
- manufacturing (circuit board fabrication facilities)
- retail (product distribution centers)
- transportation (airlines, overnight delivery services)

In their role as system integrators, IEs analyze and design systems. For example:

- facilities layout,
- material handling systems,
- manufacturing and other production systems,
- information systems,
- individual and group workplaces.

In the operations realm, IEs analyze, design and manage processes. For example:

- manufacturing processes-service processes,
- production system planning and control,
- resource allocation and scheduling,
- personnel assignment and scheduling,
- quality assurance,
- inventory control,
- system and personnel safety.

MANUFACTURING ENGINEERING

The Manufacturing Engineering degree is a more specialized degree, focusing on both high-tech manufacturing and traditional manufacturing. In particular, it is a specialization of industrial engineering that focuses on the making of physical products. The Manufacturing Engineering degree offers a hands-on education, and manufacturing engineering students are encouraged to participate in the college’s MECOP program, a nationally recognized industrial cooperative education program.

Students who complete the requirements for the Manufacturing Engineering degree plus 32 additional credits (at least 16 of these credits must be from the list of industrial engineering restricted electives) can earn two separate degrees, one in manufacturing engineering and the other in industrial engineering. The additional 32 credits typically take two additional quarters to complete.

UNDERGRADUATE MAJORS WITH OPTIONS

ENERGY SYSTEMS ENGINEERING (BS, CRED)

Offered at OSU-Cascades only.

The Energy Systems Engineering major provides students with the knowledge necessary to understand and make appropriate decisions about the design, construction, operation, and maintenance of energy systems. It emphasizes fundamental skills in engineering analysis, business, and project management. These skills are taught in the context of energy conversion systems such as power plants and solar collectors, energy storage such as batteries and hydrogen, energy distribution systems, and the efficient use of energy in building, manufacturing, and processing systems.

A part of this program includes the study of secondary effects of energy use such as local environmental impacts, national economic impacts, and global climate change. Throughout the curriculum, an important emphasis and distinctive feature is the treatment of these energy technologies as complex systems that require management with an eye to both business concerns and environmental issues, as well as the traditional technical challenges of energy engineering.

Note: The Pre-Energy Systems Engineering major (major code 257) is available on the Corvallis campus, but the pro-school courses for the Energy Systems Engineering major (major code 293) are only offered on the OSU-Cascades campus.

Baccalaureate Core (35 at OSU or 37 at COCC)

Communications

WR 121. English Composition (4)(COCC) or WR 121. *English Composition (3)(OSU)^E
WR 122. English Composition (4)(COCC) or WR 227. Technical Writing (4)(COCC) or WR 327. *Technical Writing (3)(OSU)
SP 111. *Fundamentals of Public Speaking (3)(COCC) or COMM 111. *Public Speaking (3)(OSU) or COMM 114. *Argument and Critical Discourse (3)(OSU)^E

Skills

HHP 295. Health and Fitness (3)(COCC) or HHS 231. *Lifetime Fitness for Health (2)(OSU) and HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)(OSU) or any PAC course (1–2)(OSU)

Perspectives

Western Culture (3)
Cultural Diversity (3)
Literature and the Arts (3)
Social Processes and Institutions:
ECON 201. *Microeconomics (4)(COCC) or ECON 201. *Introduction to Microeconomics (4)(OSU)
Difference, Power and Discrimination (3)

Synthesis

Contemporary Global Issues: NR 350.
*Sustainable Communities (4)(OSU)
Science, Technology, and Society (3)

Math and Science**(46 at OSU or 52 at COCC)**

CH 221. General Chemistry I (5)(COCC)
or CH 201. Chemistry for Engineering
Majors (3)(OSU)^E
CH 222. General Chemistry II (5)(COCC)
or CH 202. Chemistry for Engineering
Majors (3)(OSU)⁵
and CH 205. Laboratory for CH 202 (1)
(OSU)
MTH 251. *Calculus I (4)(COCC)
or MTH 251. *Differential Calculus (4)
(OSU)^E
MTH 252. Calculus II (4)(COCC)
or MTH 252. Integral Calculus (4)(OSU)^E
MTH 253. Calculus III (4)(COCC)
or MTH 306. Matrix and Power Series
Methods (4)(OSU)^E
MTH 254. Vector Calculus I (4)(COCC)
or MTH 254. Vector Calculus I (4)(OSU)^E
MTH 256. Applied Differential Equations
(4)(COCC)
or MTH 256. Applied Differential
Equations (4)(OSU)^E
PH 211. General Physics I (5)(COCC)
or PH 211. *General Physics with Calculus
(4)(OSU)^E
PH 212. General Physics II (5)(COCC)
or PH 213. *General Physics with Calculus
(4)(OSU)^E
PH 213. General Physics III (5)(COCC)
or PH 212. *General Physics with Calculus
(4)(OSU)^E
ST 314. Introduction to Statistics for
Engineers (3)⁵
Biological Science Elective (4)

**Business Management Courses
(19 at OSU or 19 at COCC)**

BA 217. Accounting Fundamentals (3)
(COCC)
or BA 215. Fundamentals of Accounting
(4)(OSU or Ecampus)
BA 352. Managing Individual and Team
Performance (4)
or BA 351. Managing Organizations (4)
(OSU or Ecampus, not OSU-Cascades)
BA 357. Operations Management (4)
BA 360. Introduction to Financial
Management (4)
or ENGR 390. Engineering Economy (3)
(OSU or Ecampus)
MGMT 364. Project Management (4)

**Engineering (80 at OSU or 84 at
COCC)**

CIS 122. Introduction to Programming (4)
(COCC)
or IE 212. Computational Methods for
Industrial Engineering (4)(OSU)
ESE 355. Energy Regulation (4)
ESE 360. Energy Consumption Analysis (4)
ESE 450. Energy Generation Systems (4)
ESE 470. Energy Distribution Systems (4)
ESE 471. Energy Storage Systems (4)
ESE 497. ^MIME Capstone Design (4)
**[Pending submission and approval
of a proposal]**
ESE 498. ^MIME Capstone Design (4)
**[Pending submission and approval
of a proposal]**

ENGR 201. Electrical Fundamentals (4)
(COCC)
or ENGR 201. Electrical Fundamentals I
(3)(OSU)^E
ENGR 202. Electrical Fundamentals II (4)
(COCC)
or ENGR 202. Electrical Fundamentals II
(3)(OSU)⁵
ENGR 211. Statics (4)(COCC)
or ENGR 211. Statics (3)(OSU)
ENGR 212. Dynamics (4)(COCC)
or ENGR 212. Dynamics (3)(OSU)^E
GE 101. Engineering Orientation (3)(COCC)
or MIME 101. Introduction to MIME (3)
(OSU)
GE 102. Engineering Problem Solving and
Technology (3)(COCC)
or ENGR 112. Introduction to Engineering
Computing (3)(OSU)^E
IE 415. Simulation and Decision Support
Systems (4)
IE 425. Industrial Systems Optimization (4)
ME 311/NE 311. Introduction to Thermal-
Fluid Sciences (4)
ME 312/NE 312. Thermodynamics (4)
ME 331. Introductory to Fluid Mechanics (4)
ME 332. Heat Transfer (4)
Restricted Technical Electives (6)[*No more
than 3 credits from 200-level courses.*]

Total=180 at OSU (192 at COCC)**Footnotes:**

* Bacc Core Course
^ Writing Intensive Course (WIC)
^E Required for entry into the professional
program.
⁵ Prerequisite for upper-division courses.
Recommended for completion prior to
entry into the professional program.

COCC Course Catalog Online: [http://
www.cocc.edu/Admissions/Catalog/](http://www.cocc.edu/Admissions/Catalog/)

COCC/OSU Course Equivalencies

Table: [http://oregonstate.edu/admis-
sions/course-equivalencies-central-ore-
gon-community-college](http://oregonstate.edu/admissions/course-equivalencies-central-oregon-community-college)

**INDUSTRIAL ENGINEERING
(BS, CRED, HBS)****ABET Accredited**

For more information, please contact
program advisor Tyler DeAdder, 541-737-
4718, tyler.deadder@oregonstate.edu.

Pre-Industrial Engineering**Freshman Year (46)**

CH 201. Chemistry for Engineering Majors
(3)^E
CH 202. Chemistry for Engineering Majors
(3)⁵
COMM 111. *Public Speaking (3)^E
or COMM 114. *Argument and Critical
Discourse (3)^E
ENGR 112. Introduction to Engineering
Computing (3)^E
ENGR 248. Engineering Graphics and 3-D
Modeling (3)⁵
HHS 231. *Lifetime Fitness for Health (2)
HHS 241–HHS 248. *Lifetime Fitness:
(various activities) (1)
or any PAC course (1–2)
MIME 101. Introduction to MIME (3)
MTH 251. *Differential Calculus (4)^E
MTH 252. Integral Calculus (4)^E

MTH 254. Vector Calculus I (4)^E
PH 211. *General Physics with Calculus (4)^E
WR 121. *English Composition (3)^E
*Perspectives (6)¹

Sophomore Year (45)

ENGR 211. Statics (3)^E
ENGR 212. Dynamics (3)
ENGR 213. Strength of Materials (3)^E
ENGR 390. Engineering Economy (3)⁵
IE 212. Computational Methods for
Industrial Engineering (4)⁵
IE 285. Introduction to Industrial and
Manufacturing Engineering (3)
ME 250. Introduction to Manufacturing
Processes (1)
MTH 256. Applied Differential Equations (4)^E
MTH 306. Matrix and Power Series Methods
(4)^E
PH 212, PH 213. *General Physics with
Calculus (4,4)^E
ST 314. Introduction to Statistics for
Engineers (3)⁵
WR 327. *Technical Writing (3)
Engineering Elective (3)
*Difference, Power, and Discrimination (3)¹

Professional Industrial Engineering**Junior Year (45)**

ENGR 201. Electrical Fundamentals I (3)
ENGR 321. Introduction to Materials
Science (4)
MFGE 336. Production Engineering (4)
IE 355. Statistical Quality Control (4)
IE 356. Experimental Design for Industrial
Processes (4)
IE 366. Work Systems Engineering (4)
IE 367. Production Planning and Control (4)
IE 368. Facility Design and Operations
Management (4)
Restricted IME Electives (8)
*Perspectives (6)¹

Senior Year (44)

IE 412. Information Systems Engineering (4)
IE 415. Simulation and Decision Support
Systems (4)
IE 425. Industrial Systems Optimization (4)
IE 497, IE 498. ^MIME Capstone Design (4,4)
Biological Science Elective (4)¹
Restricted IME Electives (14)
*Synthesis Courses (6)¹

Total=180**Footnotes:**

* Baccalaureate Core Course
^ Writing Intensive Course (WIC)
^E Required for entry into the professional
program.
¹ Must be selected to satisfy baccalaureate
core requirements.
⁵ Prerequisite for several upper-division
courses. Recommended for completion
prior to entry into the professional
program.

BUSINESS ENGINEERING OPTION

Students who complete the Business En-
gineering option will be well prepared to
integrate industrial engineering solutions
in business settings.

Required Courses

BA 211. Financial Accounting (4)

BA 230. Business Law I (4)
 BA 390. Marketing (4)
 BA/FIN 342. Advanced Financial Management (4)
 IE 470. Management Systems Engineering (4)
 IE 471. Project Management in Engineering (3)
 IE 475. Advanced Manufacturing Costing Techniques (3)

MANUFACTURING ENGINEERING (BS, CRED, HBS)

ABET Accredited

For more information, please contact program advisor Tyler DeAdder, 541-737-4718, tyler.deadder@oregonstate.edu.

Pre-Manufacturing Engineering

Freshman Year (46)

CH 201. Chemistry for Engineering Majors (3)^E
 CH 202. Chemistry for Engineering Majors (3)⁵
 COMM 111. *Public Speaking (3)^E or COMM 114. *Argument and Critical Discourse (3)^E
 ENGR 112. Introduction to Engineering Computing (3)^E
 ENGR 248. Engineering Graphics and 3-D Modeling (3)⁵
 HHS 231. *Lifetime Fitness for Health (2)
 HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1) or any PAC course (1–2)
 MIME 101. Introduction to MIME (3)
 MTH 251. *Differential Calculus (4)^E
 MTH 252. Integral Calculus (4)^E
 MTH 254. Vector Calculus I (4)^E
 PH 211. *General Physics with Calculus (4)^E
 WR 121. *English Composition (3)^E
 *Perspectives (6)¹

Sophomore Year (45)

ENGR 211. Statics (3)^E
 ENGR 212. Dynamics (3)
 ENGR 213. Strength of Materials (3)^E
 ENGR 390. Engineering Economy (3)⁵
 IE 212. Computational Methods for Industrial Engineering (4)⁵
 ME 250. Introduction to Manufacturing Processes (1)
 MFGE 285. Introduction to Industrial and Manufacturing Engineering (3)
 MTH 256. Applied Differential Equations (4)^E
 MTH 306. Matrix and Power Series Methods (4)^E
 PH 212, PH 213. *General Physics with Calculus (4,4)^E
 ST 314. Introduction to Statistics for Engineers (3)⁵
 WR 327. *Technical Writing (3)
 *Difference, Power, and Discrimination (3)¹

Professional Manufacturing Engineering

Junior Year (44)

ENGR 201. Electrical Fundamentals I (3)
 ENGR 321. Introduction to Materials Science (4)
 MFGE 336. Production Engineering (4)
 IE 355. Statistical Quality Control (4)
 IE 356. Experimental Design for Industrial Processes (4)

IE 366. Work Systems Engineering (4)
 IE 367. Production Planning and Control (4)
 IE 368. Facility Design and Operations Management (4)
 ME 382. Introduction to Design (4)
 Manufacturing Process Elective (3)
 *Perspectives (6)¹

Senior Year (45)

IE 412. Information Systems Engineering (4)
 IE 415. Simulation and Decision Support Systems (4)
 IE 497, IE 498. ^MIME Capstone Design (4,4)
 ME 311. Introduction to Thermal-Fluid Sciences (4)
 ME 413. Computer-Aided Design and Manufacturing (4)
 MFGE 337. Materials and Manufacturing Processes (4)
 MFGE 436. Lean Manufacturing Systems Engineering (4)
 *Biological Science Elective (4)¹
 Manufacturing Systems Elective (3)
 *Synthesis Courses (6)¹

Total=180

Footnotes:

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)
^E Required for entry into the professional program.
¹ Must be selected to satisfy the requirements of the baccalaureate core.
⁵ Prerequisite for several upper-division courses. Recommended for completion prior to entry into the professional program.

MECHANICAL ENGINEERING (BS, CRED, HBS)

ABET Accredited

For more information, please contact program advisor Michelle McAllaster, 541-737-7005, michelle.eck@oregonstate.edu.

Pre-Mechanical Engineering

Freshman Year (47)

CH 201. Chemistry for Engineering Majors (3)^E
 CH 202. Chemistry for Engineering Majors (3)⁵
 CH 205. Laboratory for CH 202 (1)
 COMM 111. *Public Speaking (3)^{1,E} or COMM 114. *Argument and Critical Discourse (3)
 HHS 231. *Lifetime Fitness for Health (2)¹
 HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)¹ or any PAC course (1–2)
 ENGR 248. Engineering Graphics and 3-D Modeling (3)⁵
 MIME 101. Introduction to Mechanical Engineering (3)
 MTH 251. *Differential Calculus (4)^E
 MTH 252. Integral Calculus (4)^E
 MTH 254. Vector Calculus I (4)^E
 PH 211. *General Physics with Calculus (4)^E
 WR 121. *English Composition (3)^E
 *Perspectives Courses (9)¹

Sophomore Year (48)

ENGR 112. Introduction to Engineering Computing (3)^E

ENGR 201. Electrical Fundamentals I (3)⁵
 ENGR 202. Electrical Fundamentals II (3)
 ENGR 211. Statics (3)^E
 ENGR 212. Dynamics (3)^E
 ENGR 213. Strength of Materials (3)⁵
 ENGR 391. Engineering Economics and Project Management (3)
 MTH 256. Applied Differential Equations (4)^E
 MTH 306. Matrix and Power Series Methods (4)^E
 PH 212, PH 213. *General Physics with Calculus (4,4)^E
 ST 314. Introduction to Statistics for Engineers (3)⁵
 WR 327. *Technical Writing (3)
 Biological Science Course (4)¹
 *Difference, Power, and Discrimination Elective (3)¹

Professional Mechanical Engineering

Junior Year (44)

ENGR 321. Materials Science (4)
 ENGR 322. Mechanical Properties of Materials (3)
 ME 250. Introduction to Manufacturing Processes (1)
 ME 311. Introduction to Thermal-Fluid Sciences (4)
 ME 312. Thermodynamics (4)
 ME 316. Mechanics of Materials (3)
 ME 317. Intermediate Dynamics (4)
 ME 331. Introductory Fluid Mechanics (4)
 ME 332. Heat Transfer (4)
 ME 373. Mechanical Engineering Methods (3)
 ME 382. Introduction to Design (4)
 ME 383. Mechanical Component Design (4)

Senior Year (41)

ME 497, ME 498. ^MIME Capstone Design (4,4)
 ME 430. Systems Dynamics and Control (4)
 ME 451. Introduction to Instrumentation and Measurement Systems (4)
 Restricted ME Technical Electives (11)
 Restricted ME Laboratory Elective (4)
 Perspectives (4)¹
 *Synthesis Courses (6)¹

Total=180

Footnotes:

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)
^E Required for entry into the professional program.
¹ Must be selected to satisfy baccalaureate core requirements.
⁵ Prerequisite for upper-division courses. Recommended for completion prior to entry into the professional program.

INDUSTRIAL ENGINEERING (MEng, MS, PhD, MAIS)

Graduate Areas of Concentration

Human systems engineering, information systems engineering, manufacturing systems engineering, nanol/micro fabrication

Industrial engineering is the application of science, mathematics, and engineering methods to complex system integration and operation. Because the systems with which they work are so large and complex, industrial engineers (IEs) must

develop expertise in a wide variety of disciplines, the ability to work well with people, and a broad, systems perspective. All IE graduate students learn advanced methods of system integration and operation. As practitioners, MEng and MS graduates analyze and design facilities, material handling systems, manufacturing processes, information systems, and workstations. They also develop, apply, and oversee policies, procedures, and algorithms for production planning, inventory control, resource allocation and scheduling, quality assurance, and supply chain management. As researchers, MS and PhD graduates advance the field of industrial and manufacturing engineering by their work in industrial corporations and government agencies. As educators, PhD graduates teach and perform research in industrial and manufacturing engineering in universities around the world.

GRADUATE OPTION

ENGINEERING MANAGEMENT OPTION

Available via Ecampus only.

The graduate option in Engineering Management at Oregon State University is designed for engineers and scientists who are conversant in the language and methods of engineering and technology, and motivated to become managers and leaders. The curriculum will equip practicing engineers and scientists with the knowledge and skills necessary to effectively manage technical resources to accomplish complex technical tasks.

Required

- IE 581. Operations Management (4)
- IE 582. Introduction to Management for Engineers and Scientists (4)
- IE 583. Advanced Engineering Economics Analysis (4)

MATERIALS SCIENCE (MS, PhD)

Graduate Areas of Concentration
Chemistry, chemical engineering, civil engineering, electrical and computer engineering, forest products, mathematics, mechanical engineering, nuclear engineering, physics

The discipline of materials science is inherently interdisciplinary, involving fundamental aspects of chemistry, physics, biology, geoscience, agricultural science, mathematics, and engineering.

Reflecting this characteristic, the Materials Science Program at Oregon State University, initiated in the 1980s, is distributed over nine departments spanning three OSU colleges. This allows students to earn MS and PhD degrees in Materials Science in many different areas of concentration, including all classes of materials, and in a wide range of materials behavior. The course work

requirements are extremely flexible to allow students to tailor their program of study to directly support their research activities.

Applications and other inquiries should be forwarded to: Prof. Bill Warnes, Materials Science Program Director, 204 Rogers Hall, Oregon State University, Corvallis, OR, 97331, USA. Email: william.warnes@oregonstate.edu.

For more information, visit the website at <http://matsci.oregonstate.edu/>

MECHANICAL ENGINEERING (MEng, MS, PhD)

Graduate Areas of Concentration

Applied mechanics, applied thermodynamics, biomechanics, combustion, design, design and analysis of mechanical and thermal fluid systems, dynamics, energy, fluid mechanics, heat transfer, materials science, mechanical engineering, physical and mechanical metallurgy, solid mechanics, stress analysis, systems and control

The School of Mechanical, Industrial, and Manufacturing Engineering offers graduate programs leading to the Master of Engineering, Master of Science, and Doctor of Philosophy degrees. Master's degree candidates may pursue thesis or nonthesis options; students in the nonthesis option must complete additional course work where an individual project may be included.

The mechanical engineering field is diverse, therefore research activities in the school encompass a broad range of technical endeavors. Areas of research include applied mechanics, solid mechanics, biomechanics, dynamics, stress analysis, design, systems and control, energy, applied thermodynamics, heat transfer, fluid mechanics, metallurgy, and materials science.

In addition, research activities have been directed toward areas of current interest and need, including wind energy, microscale energy conversion, combustion, composite materials, superconductors, advanced materials, impact dynamics, mechatronics, microscale fluid mechanics, diagnostics in design, design for manufacture and computer-aided design and manufacturing, design and control of complex systems.

GRADUATE OPTIONS

DESIGN OPTION

Required

ME 507. Seminar: Design and Mechanics (1)
Choose 15 credits from the following courses:

- ME 511. CAD/CAM III (3)
- ME 512. Design of Mechanisms (4)
- ME 515. Risk and Reliability Analysis in Engineering Design (4)
- ME 516. Modeling and Analysis of Complex Systems (4)

- ME 517. Optimization in Design (3)
- ME 518. The Concurrent Design of Products (3)
- ME 611. Modern Product Design (4)
- MFGE 536. Lean Manufacturing Systems Engineering (4)

Total=16

MATERIALS MECHANICS OPTION

Required

- ME 507. Seminar: Materials Science (1)
- ME 520. Applied Stress Analysis (4)
- ME 570. Structure Property Relations in Materials (4)

Choose one course from the following (mechanical behavior):

- ME 583. Composite Materials (3)
- ME 584. Advanced Fracture of Materials (4)
- ME 585. Fatigue of Materials (4)
- ME 587. Dislocations, Deformation, and Creep (4)

Choose one course from the following (mechanics):

- ME 523. Advanced Stress Analysis (4)
- ME 524. Finite Element Modeling of Mechanical Engineering Systems (4)
- ME 553 Structure and Mechanics Laboratory (4)

Total=16–17

ROBOTICS OPTION

Required:

- ME 507. Seminar: Robotics and Control (1)

Choose 16 credits from the following:

- ENGR 521. Applied Robotics (4)
- ME 531. Linear Multivariable Control Systems I (4)
- ME 532. Linear Multivariable Control Systems II (4)
- ME 533. Nonlinear Dynamic Analysis (4)
- ME 536. Actuator Dynamics (4)
- ME 537. Learning-Based Control (4)
- ME 538. Autonomous Agents and Multi-Agent Systems (4)

Total=17

THERMAL FLUID SCIENCES OPTION

Required:

- ME 507. Seminar: Thermal Fluid Science Seminar (1)
- ME 526. Numerical Methods for Engineering Analysis (4)
- ME 550. Applied Heat Transfer (4)
- ME 552. Measurements in Fluid Mechanics and Heat Transfer (4)
- ME 560. Intermediate Fluid Mechanics (4)

Total=17

INDUSTRIAL ENGINEERING GRADUATE MINOR

For more details, see the school advisor.

MATERIALS SCIENCE GRADUATE MINOR

For more details, see the school advisor.

MECHANICAL ENGINEERING GRADUATE MINOR

For more details, see the school advisor.

■ ENERGY SYSTEMS ENGINEERING COURSES

ESE 355. ENERGY REGULATION (4).

Introductory course to the policies and laws governing energy generation and transmission in the United States with a focus on electricity. History of regulations give context to understand current regulation and potential future policies. Laws regulating the use of alternative energy resources covered in a practical setting. Offered at OSU-Cascades only. **PREREQS:** BA 360* or ENGR 390* and junior standing in ESE pro school.

ESE 360. ENERGY CONSUMPTION ANALYSIS (4).

Analysis of energy use in transportation, residential and industrial sectors to understand how new technologies improve energy efficiency. Tradeoff techniques applied to decide between less efficient, less expensive systems versus more efficient, more expensive systems. International energy consumption compared, and energy losses evaluated for heating, cooling and electronic systems. Offered at OSU-Cascades only. **PREREQS:** (BA 360* or ENGR 390*) and ME 311 and junior standing in ESE pro school.

ESE 450. ENERGY GENERATION SYSTEMS (4).

Survey of technical fundamentals and operational principles of conventional and renewable energy conversion systems to understand the environmental and sustainable issues for energy systems currently in use or may be used in the future to power our industrial society. Offered at OSU-Cascades only. **PREREQS:** ME 312

ESE 470. ENERGY DISTRIBUTION SYSTEMS (4).

Detailed coverage of the electrical energy distribution system, its operation, control and design. Design considerations and impacts to meet emerging and evolving customer needs. Broader understanding of natural gas and oil pipeline distribution for these infrastructure commodities. Offered at OSU-Cascades only. **PREREQS:** ENGR 202 and ME 311

ESE 471. ENERGY STORAGE SYSTEMS (4).

Coverage of energy storage techniques involving electrochemical, mechanical and emerging options. Integration of the energy storage media, its effects on the bulk power system, and design tradeoffs to understand environmental impacts, cost, reliabilities, and efficiencies for commercialization of bulk energy storage. Offered at OSU-Cascades only. **PREREQS:** ENGR 202 and ME 312

ESE 497 MIME CAPSTONE DESIGN (4).

Product design; selection and replacement of major tools, processes, and equipment; paperwork controls; subsystem revision; system or plant revision; selection and training of personnel; long-run policies and strategy. **CROSSLISTED** as IE 497 and ME 497. (Writing Intensive Course) **PREREQS:** ((IE 355 and IE 356 and IE 366 and IE 367 and IE 368 and WR 327) or ((ENGR 322 and (ENGR 391 or ENGR 391H) and ME 250 and (ME 312 or ME 312H) and (ME 317 or ME 317H) and (ME 332* or ME 332H*) and ME 383 and WR 327 and (ST 314 or ST 314H)(ENGR 390 or BA 360) and IE 425 and (ME 331* or ME 331H*) and ESE 355 and ESE 360

ESE 498. ^MIME CAPSTONE DESIGN (4).

Product design; selection and replacement of major tools, processes, and equipment; paperwork controls; subsystem revision; system or plant revision; selection and training of personnel; long-run policies and strategy. **CROSSLISTED** as IE 498 and ME 498. (Writing Intensive Course) **PREREQS:** ESE 497 or IE 497 or ME 497

■ INDUSTRIAL ENGINEERING COURSES

IE 199. SPECIAL TOPICS (1-16). Special topics in industrial engineering. This course is repeatable for a maximum of 16 credits.

IE 212. COMPUTATIONAL METHODS FOR INDUSTRIAL ENGINEERING (4). Engineering

problem solving using computational methods. Data structures. Modular programming. Sorting and search algorithms. Algorithms for inventory models, production scheduling, production line analysis, and optimization. **PREREQS:** ENGR 112 and algebra, calculus, differentiation and integration.

IE 285. INTRODUCTION TO INDUSTRIAL AND MANUFACTURING ENGINEERING (3).

Introduction to selected topics in industrial and manufacturing engineering, including history and philosophy, product design and manufacturing cycle, integrate role of engineering and business, and multi-objective nature of organizations. Surveys of selected design problems in resource allocation, operations and quality management, and production engineering. **CROSSLISTED** as MFGE 285.

IE 299. SPECIAL TOPICS (1-16). Special topics in industrial engineering. This course is repeatable for a maximum of 16 credits.

IE 355. STATISTICAL QUALITY CONTROL (4). Control of quality through the use of statistical analysis; typical control techniques and underlying theory. Development of reliability models and procedures for product assurance. Lec/lab. **PREREQS:** ST 314

IE 356. EXPERIMENTAL DESIGN FOR INDUSTRIAL PROCESSES (4). Systematic analysis of processes through the use of statistical analysis, methods, and procedures. Application of statistical techniques including use of classic process analysis techniques, regression and design of experiments. Lec/rec. **PREREQS:** ST 314

IE 366. WORK SYSTEMS ENGINEERING (4).

Principles and techniques of work measurement, methods engineering, workplace design, work sampling, and predetermined time systems. Basic human factors engineering and ergonomics principles applied to workplace design. The work systems engineering process. Lec/lab/rec. **PREREQS:** ST 314

IE 367. PRODUCTION PLANNING AND CONTROL (4). Forecasting techniques, inventory analysis, master production scheduling, material and capacity requirements, planning and scheduling methods. **PREREQS:** ST 314 or equivalent statistical material.

IE 368. FACILITY DESIGN AND OPERATIONS MANAGEMENT (4).

Design and analysis of industrial facilities including just-in-time systems, queuing, material handling systems, material flow analysis, line balancing, systematic layout planning, design of warehouse facilities, and facilities location. **PREREQS:** ST 314 or equivalent.

IE 380. *THE RESPONSIBLE ENGINEER (3).

The idea of responsibility and the ethical responsibilities of the engineer. Introduction to value, ethics, and ethical systems. Engineering as value creation and the ethical ramifications of engineering. Codes of engineering ethics. Recognizing and addressing ethical dilemmas in engineering. Examination of the individual, social, and environmental effects of engineering and technology. (Baccalaureate Core Course)

IE 399. SPECIAL TOPICS (1-16). Special topics in industrial engineering. This course is repeatable for a maximum of 16 credits.

IE 403. THESIS (1-16). **PREREQS:** Departmental approval required.

IE 405. READING AND CONFERENCE (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

IE 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

PREREQS: Departmental approval required.

IE 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

IE 410. INTERNSHIP (1-16).

IE 411. VISUAL PROGRAMMING FOR INDUSTRIAL APPLICATIONS (4). Object-oriented modeling, Unified Modeling Language, software development concepts, file and database connectivity, and visual programming skills (Microsoft Visual Basic) for use in developing industrial applications, such as process monitoring and supply chain management. **PREREQS:** IE 212

IE 412. INFORMATION SYSTEMS ENGINEERING (4).

Framework for enterprise information systems. Engineering and scientific systems. Requirements definition, enhanced entity relationship modeling, logical modeling, structured query language, relational model, referential integrity. Lec/lab.

IE 415. SIMULATION AND DECISION SUPPORT SYSTEMS (4).

Analysis and design of integrated manufacturing systems through the application of computer modeling techniques. Model validation and verification. Application of simulation and decision support systems to management and engineering. Lec/lab. **PREREQS:** ST 314

IE 418. TELECOMMUNICATION CONCEPTS (3).

Telecommunication concepts for industrial applications. OSI reference model, local area networks, wide area networks, internet architecture. Taught fall in even years. **PREREQS:** IE 212 and previous programming experience.

IE 419. WIRELESS NETWORKS (3).

RF fundamentals, ISO 802.11 standards, spread spectrum technology, narrow band technology, direct sequence and frequency hopping transmission schemes, electromagnetic interference, design of indoor wireless networks. **PREREQS:** IE 418

IE 425. INDUSTRIAL SYSTEMS OPTIMIZATION (4).

A first course in operations research. Topics include mathematical programming formulations and solutions, the simplex method, network optimization, introduction to metaheuristics, and probability models. **PREREQS:** (ST 314 and (MTH 306 or MTH 341))

IE 437. VIRTUAL AND AUTOMATED MANUFACTURING SYSTEMS (4).

Automated manufacturing system design and operations-sensors, actuators, programmable controls. Concepts for integrated design/verification of virtual system models, control and hardware implementation.

IE 470. MANAGEMENT SYSTEMS ENGINEERING (4).

Improvement of organizational performance through the design and implementation of systems that integrate personnel, technological, environmental, and organizational variables. Topics include performance assessment and measurement as well as improvement methodologies. **PREREQS:** Senior standing.

IE 471. PROJECT MANAGEMENT IN ENGINEERING (3).

Critical issues in the management of engineering and high-technology projects are discussed. Time, cost, and performance parameters are analyzed from the organizational, people, and resource perspectives. Network optimization and simulation concepts are introduced. Resource-constrained project scheduling case discussions and a term project are included. **PREREQS:** Junior standing in engineering.

IE 475. ADVANCED MANUFACTURING COSTING TECHNIQUES (3).

Costing techniques applicable in advanced manufacturing enterprises: activity-based costing, economic value added, Japanese cost management techniques, life cycle costing, throughput accounting, cost of quality, and financial versus operational performance measures. Emphasis on linkages to such advanced manufacturing systems as cellular manufacturing, flexible manufacturing, JIT, Lean, and ERP. **PREREQS:** ENGR 390

IE 497. ^MIME CAPSTONE DESIGN (4). Product design; selection and replacement of major tools, processes, and equipment; paperwork controls; subsystem revision; system or plant revision; selection and training of personnel; long-run policies and strategy. **CROSSLISTED** as ESE 497 and ME 497. (Writing Intensive Course) **PREREQS:** ((IE 355 and IE 356 and IE 366 and IE 367 and IE 368 and WR 327)) or ((ENGR 322 and (ENGR 391 or ENGR 391H) and ME 250 and (ME 312 or ME 312H) and (ME 317 or ME 317H) and (ME 332 or ME 332H) and ME 383 and WR 327 and (ST 314 or ST 314H)(ENGR 390 or BA 360) and IE 425 and (ME 331 or ME 331H) and ESE 355 and ESE 360

IE 498. ^MIME CAPSTONE DESIGN (4). Product design; selection and replacement of major tools, processes, and equipment; paperwork controls; subsystem revision; system or plant revision; selection and training of personnel; long-run policies and strategy. **CROSSLISTED** as ESE 498 and ME 498. (Writing Intensive Course) **PREREQS:** ESE 497 or IE 497 or ME 497

IE 499. SELECTED TOPICS IN SYSTEM STUDIES (1-5). Recent advances in industrial engineering pertaining to the theory and application of system studies. Analysis and design of natural resource systems; evaluation; detection extraction; processing and marketing systems; advanced design of production systems with reference to social, economic, and regional planning; human engineering studies of man-machine systems; applications of operations research techniques. Nonsequence course. Not offered every term. This course is repeatable for a maximum of 99 credits.

IE 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

IE 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

IE 506. PROJECTS (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

IE 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

IE 511. VISUAL PROGRAMMING FOR INDUSTRIAL APPLICATIONS (4). Object-oriented modeling, Unified Modeling Language, software development concepts, file and database connectivity, and visual programming skills (Microsoft Visual Basic) for use in developing industrial applications, such as process monitoring and supply chain management. **PREREQS:** IE 212

IE 512. INFORMATION SYSTEMS ENGINEERING (4). Framework for enterprise information systems. Engineering and scientific systems. Requirements definition, enhanced entity relationship modeling, logical modeling, structured query language, relational model, referential integrity. Lec/lab.

IE 515. SIMULATION AND DECISION SUPPORT SYSTEMS (4). Analysis and design of integrated manufacturing systems through the application of computer modeling techniques. Model validation and verification. Application of simulation and decision support systems to management and engineering. Lec/lab. **PREREQS:** ST 314

IE 518. TELECOMMUNICATION CONCEPTS (3). Telecommunication concepts for industrial applications. OSI reference model, local area networks, wide area networks, internet architecture. Taught fall in even years. **PREREQS:** IE 212 and previous programming experience.

IE 519. WIRELESS NETWORKS (3). RF fundamentals, ISO 802.11 standards, spread spectrum technology, narrow band technology, direct sequence and frequency hopping transmission schemes, electromagnetic

interference, design of indoor wireless networks. **PREREQS:** IE 518

IE 521. INDUSTRIAL SYSTEMS OPTIMIZATION I (3). Techniques for analysis and solution of problems in industrial and management systems. Emphasis on application of linear and integer programming and extensions. **PREREQS:** MTH 341

IE 522. INDUSTRIAL SYSTEMS OPTIMIZATION II (3). Techniques for analysis and solution of problems in industrial and management systems. Emphasis on applications of dynamic programming, Markovian processes, and questions as applied to industrial problems. **PREREQS:** ST 314

IE 531. MESO-SCALE MANUFACTURING (3). Meso-scale processing techniques for fabricating microfluidic devices, especially microtechnology-based energy, chemical and biological systems. Introduction to microlamination and techniques for lamina patterning, registration and bonding. Lec/lab. **PREREQS:** Graduate standing in science or engineering.

IE 534. CERAMICS PROCESSING (3). Introduction to materials, manufacturing methods, properties and applications of ceramics. The emphasis of the course is on understanding and exploring the inter-relationships between material characteristics, processing variables and component geometry in the context of ceramics. **PREREQS:** Graduate standing in engineering or science, or senior standing in manufacturing engineering.

IE 536. LEAN MANUFACTURING SYSTEMS ENGINEERING (4). The planning, evaluation, deployment, and integration of lean manufacturing theory and methods. Examines manufacturing processes/equipment and systems, e.g. planning/control, product design, supply chain resource management. Lec/lab.

IE 537. VIRTUAL AND AUTOMATED MANUFACTURING SYSTEMS (4). Automated manufacturing system design and operations-sensors, actuators, programmable controls. Concepts for integrated design/verification of virtual system models, control and hardware implementation. **PREREQS:** Graduate standing in engineering.

IE 545. HUMAN FACTORS ENGINEERING (4). Analysis and design of work systems considering human characteristics, capabilities and limitations. Analysis and design of displays, controls, tools, and workstations. Human performance analysis. Human factors research methods. **PREREQS:** Graduate standing.

IE 546. HUMAN-MACHINE SYSTEMS ENGINEERING (3). Development of safe, high performance human-machine systems. System/function/task analysis, function allocation, design, mockups and rapid prototyping, human factors test and evaluation. Critical examination of the human-factors and domain-specific literature to identify human factors problems, and knowledge and methods to address those problems. **PREREQS:** IE 545

IE 548. COGNITIVE ENGINEERING (3). Theories and models of human sensory, cognitive, and motor performance pertaining to the operation of complex systems. Applications to human-machine systems engineering. Research topics and methods related to cognitive engineering. **PREREQS:** Graduate standing in science or engineering and IE 545

IE 552. DESIGN OF INDUSTRIAL EXPERIMENTS (3). A first course in design of experiments with an emphasis on applications and fundamental data analysis methods. Basic statistical inference, analysis of variance, blocking, general factorial designs, and two-level factorial designs are covered. **PREREQS:** ST 314

IE 553. DESIGN OF INDUSTRIAL EXPERIMENTS II (3). This second course in design of experiments is a continuation of IE

552. The same textbook is used. Topics covered include two-level fractional factorial designs, regression models, response surface methods, rules for expected sum of squares and expected mean squares, a summary of the "no-name" approach to DOE, and analysis of experiments with unbalanced data (time permitting). **PREREQS:** IE 552

IE 563. ADVANCED PRODUCTION PLANNING AND CONTROL (3). Application of quantitative and heuristic methods to problems of production, material, and capacity planning. Mathematical models for inventory systems, sequencing, and scheduling. Assembly line balancing methods. Just-in-time manufacturing. **PREREQS:** IE 521 and ST 314

IE 564. DESIGN AND SCHEDULING OF CELLULAR MANUFACTURING SYSTEMS (3). Designing manufacturing cells. Impact of alternate process plan on cell design. Part-machine assignment to cells. Disaggregated manufacturing cells. Group scheduling. **PREREQS:** Graduate standing, computer experience.

IE 570. MANAGEMENT SYSTEMS ENGINEERING (4). Improvement of organizational performance through the design and implementation of systems that integrate personnel, technological, environmental, and organizational variables. Topics include performance assessment and measurement as well as improvement methodologies. **PREREQS:** Graduate standing.

IE 571. PROJECT MANAGEMENT IN ENGINEERING (3). Critical issues in the management of engineering and high-technology projects are discussed. Time, cost, and performance parameters are analyzed from the organizational, people, and resource perspectives. Network optimization and simulation concepts are introduced. Resource-constrained project scheduling case discussions and a term project are included. **PREREQS:** Junior standing in engineering.

IE 581. OPERATIONS MANAGEMENT (4). Critical and current issues on the implementation of operations management strategies for the engineering manager. Includes aspects of operations in an engineering management environment such as work systems design, forecasting, strategy, facilities location and design, management of quality and resources planning and management. **PREREQS:** IE 571

IE 582. INTRODUCTION TO MANAGEMENT FOR ENGINEERS AND SCIENTISTS (4). An introduction to concepts, tools, and practices necessary for a broad understanding of the roles of engineering and technical managers. A mix of research results, case studies, and experiential learning is used to bolster theories of management, with focus on technical organizations.

IE 583. ADVANCED ENGINEERING ECONOMICS ANALYSIS (4). Examines the economics dimension of engineering management, from costing techniques to financial analysis. Topics include industrial cost analysis and estimation, economic planning, forecasting, and budgeting, and financial analysis for engineering and engineering management. **PREREQS:** Basic courses in engineering economic analysis (ENGR 390) or instructor's consent.

IE 592. SELECTED TOPICS IN SYSTEM STUDIES (1-5). Recent advances in industrial engineering pertaining to the theory and application of system studies. Analysis and design of natural resource systems; evaluation; detection extraction; processing and marketing systems; advanced design of production systems with reference to social, economic, and regional planning; human engineering studies of man-machine systems; applications of operations research techniques. Nonsequence course. Not offered every term.

IE 594. RESEARCH METHODS IN ENGINEERING (3). Introduction to research methodologies including surveys, interviews, quasi-experimentation, and case studies. Methods for research design, and collection and analysis of data. **PREREQS:** Graduate standing or instructor approval.

IE 599. SELECTED TOPICS IN SYSTEM STUDIES (1-5). Recent advances in industrial engineering pertaining to the theory and application of system studies. Analysis and design of natural resource systems; evaluation; detection extraction; processing and marketing systems; advanced design of production systems with reference to social, economic, and regional planning; human engineering studies of man-machine systems; applications of operations research techniques. Nonsequence course. Not offered every term. This course is repeatable for a maximum of 99 credits.

IE 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

IE 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

IE 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

IE 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

■ MATERIALS SCIENCE COURSES

MATS 221. THE SCIENCE, ENGINEERING AND SOCIAL IMPACT OF NANOTECHNOLOGY (3). Nanotechnology is an emerging engineering field that manipulates atoms and molecules to fabricate new materials and tiny devices. Properties of nanostructured materials, manufacturing methods, characterization methods, and impact on health and safety. Benefits and concerns about nanotechnology will be assessed. Lec/rec. **CROSSLISTED** as ENGR 221. **PREREQS:** One year of college science.

MATS 321. INTRODUCTION TO MATERIALS SCIENCE (4). Crystal structure, microstructure, and physical properties of metals, ceramics, polymers, composites, and amorphous materials. Also includes elementary mechanical behavior and phase equilibria. Lec. **CROSSLISTED** as ENGR 321. **PREREQS:** (CH 202 or CH 222 or CH 231 or CH 231H or CH 224H)

MATS 322. MECHANICAL PROPERTIES OF MATERIALS (3). Mechanical behavior of materials, relating laboratory test results to material structure, and elements of mechanical analysis. Lec/lab. **CROSSLISTED** as ENGR 322. **PREREQS:** (ENGR 213 or ENGR 213H) and (ENGR 321 or ENGR 321H or MATS 321)

MATS 455. EXPERIMENTAL TECHNIQUES IN MATERIAL SCIENCE (4). Materials processing, characterization, computational and data analysis techniques in materials science. Focus on processing-structure-property relationships. Lec/lab. **CROSSLISTED** as ME 455. This course is repeatable for a maximum of 8 credits. **PREREQS:** (ENGR 321 or ENGR 321H) and ME 570 or equivalent.

MATS 478. THIN FILM MATERIALS CHARACTERIZATION AND PROPERTIES (3). Processing of thin films and characterization of the microstructure; diffusion and solid state reactions; mechanical, magnetic and electronic properties of thin films. **CROSSLISTED** as ME 478. **PREREQS:** ((ENGR 311 or ENGR 311H or ME 311) and (ENGR 321 or MATS 321) and (ENGR 322 or MATS 322))

MATS 509. MATERIALS SCIENCE SEMINAR (1). Student participation seminar experience for one credit; students will listen to seminars concerning ongoing research activities within materials

science. Students will also have the opportunity to present their own research results periodically. Graded P/N. **CROSSLISTED** as ME 509.

MATS 555. EXPERIMENTAL TECHNIQUES IN MATERIAL SCIENCE (4). Materials processing, characterization, computational and data analysis techniques in materials science. Focus on processing-structure-property relationships. Lec/lab. **CROSSLISTED** as ME 555. This course is repeatable for a maximum of 8 credits. **PREREQS:** ME 570 and (ENGR 321 or ENGR 321H)

MATS 570. STRUCTURE PROPERTY RELATIONS IN MATERIALS (4). Fundamentals of the interactions between the structure and properties of materials. Atomic bonding and atom interactions. Geometric and algebraic representations of symmetry. Introduction to phase equilibria. Phenomenological background of elasticity and plasticity in materials. Anisotropic materials and tensor representations. Influence of structure on thermal, electrical, and optical properties of materials. **CROSSLISTED** as ME 570.

MATS 571. ELECTRONIC PROPERTIES OF MATERIALS (4). Development of a quantitative description of the electronic structure of solids starting with the quantum mechanical model of the atom, atomic bonding, and band theory of solids. Quantitative description of the electronic properties of metals, semiconductors, and insulators. **CROSSLISTED** as ME 571. **PREREQS:** CH 545 or ME 570 or equivalent.

MATS 578. THIN FILM MATERIALS CHARACTERIZATION AND PROPERTIES (3). Processing of thin films and characterization of the microstructure; diffusion and solid state reactions; mechanical, magnetic and electronic properties of thin films. **CROSSLISTED** as ME 578. **PREREQS:** (ENGR 311 or ENGR 311H or ME 311 or ME 311H) and (ENGR 321 or ENGR 321H or MATS 321) and (ENGR 322 or MATS 322)

MATS 580. MATERIALS SELECTION (3). Selecting materials for engineering applications. The major families of materials, their properties, and how their properties are controlled; case studies and design projects emphasizing materials selection. Lec/lab. **CROSSLISTED** as ME 580. **PREREQS:** ENGR 322

MATS 581. THERMODYNAMICS OF SOLIDS (4). Thermodynamics of solutions and phase equilibrium. Phase diagrams and invariant reactions. Order and disorder in solutions. Applications to advanced materials development. Lec/lab. **CROSSLISTED** as ME 581.

MATS 582. RATE PROCESSES IN MATERIALS (4). Diffusion in solids, including vacancy and interstitial and short-circuit diffusion. Phase transformations including classic nucleation and growth theory. Applications to materials development. Laboratory will emphasize microstructural evaluation and quantitative metallography. Lec/lab. **CROSSLISTED** as ME 582.

MATS 584. ADVANCED FRACTURE OF MATERIALS (4). Fracture mechanics will be used as a basis for predicting failure of materials, understanding failure mechanisms, and identifying causes of failure. Course will include discussion of recent journal articles, experimental demonstrations, and analysis of real fracture data. **CROSSLISTED** as ME 584. **PREREQS:** ENGR 322 or equivalent is recommended.

MATS 587. DISLOCATIONS, DEFORMATION, AND CREEP (4). The effects of point, line, and planar defects on plastic deformation and creep behavior in solids will be discussed with emphasis on the role of dislocations and vacancies. **CROSSLISTED** as ME 587. **PREREQS:** ENGR 322 or equivalent.

MATS 588. COMPUTATIONAL METHODS IN MATERIALS SCIENCE (4). A broad introduction to important materials science simulation methods. These include molecular dynamics, density functional theory, and Monte Carlo

methods. Learning is through a mixture of lecture and hands-on lab projects in which students use computational methods to explore and reinforce fundamental concepts in materials science. Lec/lab. **CROSSLISTED** as ME 588. **PREREQS:** Experience with Matlab or Mathematica or an equivalent numerical and programming environment.

MATS 671. ELECTRONIC PROPERTIES OF OXIDES (4). Band theory of solids applied to metal oxide materials. Includes metallic oxides, non-stoichiometric semiconductors and associated defect chemistry, high temperature superconductors, electrostatics, linear dielectrics, non-linear dielectrics, piezoelectrics, and the optical properties of oxides. **CROSSLISTED** as ME 671. **PREREQS:** ME 571 or MATS 571 or PH 575

■ MECHANICAL ENGINEERING COURSES

ME 101. INTRODUCTION TO MECHANICAL ENGINEERING (3). Orientation to mechanical engineering; methods used in solving engineering problems; experience with typical mechanical engineering projects and problems; ethics, curricula and engineering careers. Lec/rec. **PREREQS:** Trigonometry.

ME 206. PROJECTS (1-16). **PREREQS:** Sophomore standing.

ME 250. INTRODUCTION TO MANUFACTURING PROCESSES (1). Use of measuring and layout tools, interpretation of blueprints and drawings, identification of engineering materials. Operation of machine tools, including calculation of machining parameters. Operation of gas and MIG welding equipment. Lec/lab. Graded P/N. **PREREQS:** ENGR 248 and ME or IE professional school admission.

ME 299. SPECIAL TOPICS (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

ME 306. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Junior standing.

ME 311. INTRODUCTION TO THERMAL-FLUID SCIENCES (4). Basic concepts of fluid mechanics, thermodynamics and heat transfer are introduced. Conservation of mass, energy, moment and the second law of thermodynamics are included. **CROSSLISTED** as NE 311. **PREREQS:** ((ENGR 212 or ENGR 212H) and (MTH 256 or MTH 256H))

ME 311H. INTRODUCTION TO THERMAL-FLUID SCIENCES (4). Basic concepts of fluid mechanics, thermodynamics and heat transfer are introduced. Conservation of mass, energy, moment and the second law of thermodynamics are included. **CROSSLISTED** as NE 311H. **PREREQS:** ((ENGR 212 or ENGR 212H) and (MTH 256 or MTH 256H)) and Honors College approval required.

ME 312. THERMODYNAMICS (4). Exergy destruction, machine and cycle processes, law of corresponding states, non-reactive gas mixtures, reactive mixtures, thermodynamics of compressible fluid flow. **CROSSLISTED** as NE 312. **PREREQS:** (MTH 256 or MTH 256H) and (ME 311 or ME 311H or NE 311 or NE 311H)

ME 312H. THERMODYNAMICS (4). Exergy destruction, machine and cycle processes, law of corresponding states, non-reactive gas mixtures, reactive mixtures, thermodynamics of compressible fluid flow. **CROSSLISTED** as NE 312H. **PREREQS:** (MTH 256 or MTH 256H) and (ME 311 or ME 311H or NE 311 or NE 311H) and Honors College approval required.

ME 316. MECHANICS OF MATERIALS (3). Determination of stresses, deflections, and stability of deformable bodies with an introduction to finite element analysis. **PREREQS:** (ENGR 213 or ENGR 213H) and (MTH 256 or MTH 256H)

ME 317. INTERMEDIATE DYNAMICS (4). Continuation of the study of kinematics and kinetics of particles and rigid bodies, with applications to mechanical systems of current interest to engineers. **PREREQS:** ((ENGR 212 or ENGR 212H) and (MTH 256 or MTH 256H))

ME 317H. INTERMEDIATE DYNAMICS (4). Continuation of the study of kinematics and kinetics of particles and rigid bodies, with applications to mechanical systems of current interest to engineers. **PREREQS:** ((ENGR 212 or ENGR 212H) and (MTH 256 or MTH 256H)) and Honors College approval required.

ME 331. INTRODUCTORY FLUID MECHANICS (4). Introduces the concepts and applications of fluid mechanics and dimensional analysis with an emphasis on fluid behavior, internal and external flows, analysis of engineering applications of incompressible pipe systems, and external aerodynamics. **CROSSLISTED** as NE 331. **PREREQS:** ((MTH 254 or MTH 254H) and (MTH 256 or MTH 256H) and (ENGR 212 or ENGR 212H) and (ENGR 311 or ENGR 311H or ME 311 or ME 311H or NE 311 or NE 311H))

ME 331H. INTRODUCTORY FLUID MECHANICS (4). Introduces the concepts and applications of fluid mechanics and dimensional analysis with an emphasis on fluid behavior, internal and external flows, analysis of engineering applications of incompressible pipe systems, and external aerodynamics. **CROSSLISTED** as NE 331H. **PREREQS:** ((MTH 254 or MTH 254H) and (MTH 256 or MTH 256H) and (ENGR 212 or ENGR 212H) and (ENGR 311 or ENGR 311H or ME 311 or ME 311H or NE 311 or NE 311H)) and Honors College approval required.

ME 332. HEAT TRANSFER (4). A treatment of conductive, convective and radiative energy transfer using control volume and differential analysis and prediction of transport properties. **CROSSLISTED** as NE 332. **PREREQS:** ((MTH 256 or MTH 256H) and (ENGR 212 or ENGR 212H) and (ME 311 or ME 311H or NE 311 or NE 311H) and (ME 331 or ME 331H or NE 331 or NE 331H))

ME 332H. HEAT TRANSFER (4). A treatment of conductive, convective and radiative energy transfer using control volume and differential analysis and prediction of transport properties. **CROSSLISTED** as NE 332H. **PREREQS:** ((MTH 256 or MTH 256H) and (ENGR 212 or ENGR 212H) and (ME 311 or ME 311H or NE 311 or NE 311H) and (ME 331 or ME 331H or NE 331 or NE 331H)) and Honors College approval required.

ME 348. ADVANCED SOLID MODELING (1). Practical application of graphical communication theory using advanced solid modeling software to capture design intent and generate engineering drawings. Lec/lab. Graded P/N. **PREREQS:** ENGR 248

ME 373. MECHANICAL ENGINEERING METHODS (3). Analytical and numerical methods for solving representative mechanical engineering problems. Lec/rec. **PREREQS:** (ENGR 112 or ENGR 112H) and (MTH 256 or MTH 256H) and / or equivalent.

ME 373H. MECHANICAL ENGINEERING METHODS (3). Analytical and numerical methods for solving representative mechanical engineering problems. Lec/rec. **PREREQS:** (ENGR 112 or ENGR 112H) and (MTH 256 or MTH 256H) and / or equivalent. Honors College approval required.

ME 382. INTRODUCTION TO DESIGN (4). Organization, planning, economics, and the use of creativity and optimization in solving mechanical design problems. Case studies and/or industrial design problems. Lec/lab. **PREREQS:** ENGR 248 and ME 250* and ME 316*

ME 382H. INTRODUCTION TO DESIGN (4). Organization, planning, economics, and the use of creativity and optimization in solving mechanical design problems. Case studies and/or industrial design problems. Lec/lab. **PREREQS:** ENGR 248

and ME 250* and ME 316* and Honors College approval required.

ME 383. MECHANICAL COMPONENT DESIGN (4). Failure analysis and design of machine components. Lec/lab. **PREREQS:** (ME 316 and (ME 382 or ME 382H))

ME 383H. MECHANICAL COMPONENT DESIGN (4). Failure analysis and design of machine components. Lec/lab. **PREREQS:** (ME 316 and (ME 382 or ME 382H)) and Honors College approval required.

ME 401. RESEARCH (1-16). This course is repeatable for a maximum of 9 credits.

ME 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ME 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 9 credits.

ME 405H. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 9 credits. **PREREQS:** Honors College approval required.

ME 406. PROJECTS (1-16). This course is repeatable for a maximum of 15 credits.

ME 407. SEMINAR (1-16). This course is repeatable for a maximum of 2 credits.

ME 410. INTERNSHIP (1-16). Credits may not apply toward BS degree in Mechanical Engineering. Graded P/N. **PREREQS:** Departmental approval required.

ME 412. DESIGN OF MECHANISMS (4). Analysis and study of the function, classification, position, velocity, and acceleration of multi-element mechanical linkages and mechanisms. Synthesis of mechanisms for specified multiple point paths, quick return, dwell, and straight-line motion. The lecture will instruct students in the kinematic analysis and synthesis of mechanisms through the use of theory and software packages. The laboratory will familiarize students with a modern mechanism design and animation software package. Lec/lab. **PREREQS:** ME 317

ME 413. COMPUTER-AIDED DESIGN AND MANUFACTURING (4). Introduces students to the use of computers in several extended areas of product design and manufacturing. These areas include product data management in a sustaining engineering environment; computer-aided manufacturing (CAM) and computer numerical control (CNC) operations and technology; the use of programmable logic controllers (PLCs) for industrial control systems; and the use of simulation software for virtual prototyping for Design/Manufacturing/Validation. Lec/lab. **PREREQS:** (ME 382 or ME 382H or IE 366)

ME 420. APPLIED STRESS ANALYSIS (4). Elasticity theory, failure theories, energy methods, finite element analysis. **PREREQS:** ME 316

ME 422. MECHANICAL VIBRATIONS (4). Dynamic response of single and multiple degree-of-freedom systems. **PREREQS:** ME 317

ME 424. FINITE ELEMENT MODELING OF MECHANICAL ENGINEERING SYSTEMS (3). Application of modern finite element code in the analysis of complex mechanical engineering systems. Extensive use of engineering workstations. Lec/lab. **PREREQS:** (ME 420 or ME 520)

ME 430. SYSTEMS DYNAMICS AND CONTROL (4). Modeling and analysis of linear continuous systems in time and frequency domains. Fundamentals of single-input-single-output control system design. **CROSSLISTED** as ECE 451. **PREREQS:** (ME 317 or (ECE 351 and ECE 352 and (ENGR 212 or ENGR 212H))

ME 430H. SYSTEMS DYNAMICS AND CONTROL (4). Modeling and analysis of linear continuous systems in time and frequency

domains. Fundamentals of single-input-single-output control system design. **CROSSLISTED** as ECE 451. **PREREQS:** (ME 317 or (ECE 351 and ECE 352 and (ENGR 212 or ENGR 212H)) and Honors College approval required.

ME 441. INTEGRATED THERMAL/FLUID SYSTEM DESIGN (2). Comprehensive design of systems consisting of modular heat exchanger(s) and piping flow networks. Pump/compressor/fan selection, mechanical and design analyses, and material selection for compatibility considered in design. Lec/rec. **PREREQS:** ((ME 332 or ME 332H) and (ME 373 or ME 373H) and (ME 382 or ME 382H) and (ENGR 321 or ENGR 321H))

ME 444. ADVANCED POWER GENERATION SYSTEMS (4). Thermal mechanical evaluation of modern power generation technologies, including fossil and nuclear Rankine cycle power plants, gas turbines, cogeneration power plants, distributed power generation and fuel cells. Lec/rec. **PREREQS:** (ME 312 or ME 312H) and (ME 332 or ME 332H)

ME 445. INTRODUCTION TO COMBUSTION (3). Study of combustion science based on the background of chemistry, thermodynamics, fluid mechanics and heat transfer. Stoichiometry, energetics of chemical reactions, flame temperature, equilibrium product analyses, chemical kinetics, and chain reactions. **PREREQS:** (ME 312 and (ME 332 or ME 332H))

ME 450. APPLIED HEAT TRANSFER (4). An intermediate heat transfer course seeking to lay a foundation for determining the heating and cooling characteristics with a variety of modern and classical processes. Included is design of multi-component heat transfer systems. Lecture, 110 minutes twice per week. **PREREQS:** (ME 332 or ME 332H)

ME 451. INTRODUCTION TO INSTRUMENTATION AND MEASUREMENT SYSTEMS (4). Function, operation, and application of common mechanical engineering instruments, measurement principles, and statistical analysis. Major elements of measurement systems, including transduction, signal conditioning, and data recording. Function and operation of digital data acquisition systems. Lec/lab. **PREREQS:** ((ENGR 202 or ENGR 202H) and (ME 311 or ME 311H) and ME 316 and ME 317 and (ME 373 or ME 373H) and (ST 314 or ST 314H))

ME 452. THERMAL AND FLUIDS SCIENCES LABORATORY (4). Course emphasis is on experiments related to thermodynamics, heat transfer, and fluid mechanics. Proper experimental methods, data and uncertainty analysis related to thermal and fluids measurements are discussed. **PREREQS:** (ME 311 or ME 311H) and (ME 331 or ME 331H) and (ME 332 or ME 332H)

ME 452H. THERMAL AND FLUIDS SCIENCES LABORATORY (4). Course emphasis is on experiments related to thermodynamics, heat transfer, and fluid mechanics. Proper experimental methods, data and uncertainty analysis related to thermal and fluids measurements are discussed. **PREREQS:** (ME 311 or ME 311H) and (ME 331 or ME 331H) and (ME 332 or ME 332H) and Honors College approval required.

ME 453. STRUCTURE AND MECHANICS LABORATORY (4). Techniques for measurement of structural response and material properties. Proper use of rosette strain gauges, load cells, and displacement transducers. Full-field strain measurement using photoelasticity and digital image correlation. Proper implementation of material testing standards. Characterization of anisotropic composite materials. **PREREQS:** ME 451

ME 454. DYNAMIC MECHANICAL SYSTEMS LABORATORY (4). Design, implementation, and use of portable digital data acquisition systems for characterization and control of dynamic mechanical systems. Emphasis on durable

systems developed for harsh environments. Lec/lab. **PREREQS:** ME 451

ME 455. EXPERIMENTAL TECHNIQUES IN MATERIAL SCIENCE (4). Materials processing, characterization, computational and data analysis techniques in materials science. Focus on processing-structure-property relationships. Lec/lab. **CROSSLISTED** as MATS 455. This course is repeatable for a maximum of 8 credits. **PREREQS:** (ENGR 321 or ENGR 321H) and ME 570 or equivalent.

ME 456. INTELLIGENT ROBOTICS (4). Foundations of probabilistic reasoning for robotics. Topics include state estimation, robot motion, perception, localization and decision making under uncertainty. **PREREQS:** ME 373 or ME 373H or ECE 353 or CS 331

ME 460. INTERMEDIATE FLUID MECHANICS (4). Ideal fluid flow including potential flow theory. Introduction to compressible flow. Viscous flow and boundary layer theory. Introduction to turbulence. **PREREQS:** (ME 331 or ME 331H)

ME 461. GAS DYNAMICS (4). Studies one-dimensional isentropic flow, nozzles, diffusers, normal and oblique shocks, compressible flow with friction and heating, and an introduction to propulsion systems. **PREREQS:** (ME 312 and (ME 331 or ME 331H))

ME 478. THIN FILM MATERIALS CHARACTERIZATION AND PROPERTIES (3). Processing of thin films and characterization of the microstructure; diffusion and solid state reactions; mechanical, magnetic and electronic properties of thin films. **CROSSLISTED** as MATS 478. **PREREQS:** ((ENGR 311 or ENGR 311H or ME 311 or ME 311H) and (ENGR 321 or ENGR 321H or MATS 321) and (ENGR 322 or MATS 322))

ME 480. MATERIALS SELECTION (3). Selecting materials for engineering applications. The major families of materials, their properties, and how their properties are controlled; case studies and design projects emphasizing materials selection. **PREREQS:** ENGR 322

ME 483. COMPOSITE MATERIALS (3). Fibers and matrices, mechanics of composites, reinforcement and failure mechanisms, properties and applications. Lec/lab. **PREREQS:** ENGR 322

ME 484. FRACTURE OF MATERIALS (3). Fracture mechanics and fatigue mechanisms: mechanisms of ductile and brittle fracture. Environmentally induced fracture and fatigue. Considerations in design of engineering materials and structures will be discussed. **PREREQS:** ENGR 322

ME 497. ^MIME CAPSTONE DESIGN (4). Product design; selection and replacement of major tools, processes, and equipment; paperwork controls; subsystem revision; system or plant revision; selection and training of personnel; long-run policies and strategy. **CROSSLISTED** as ESE 497 and IE 497. (Writing Intensive Course) **PREREQS:** ((IE 355 and IE 356 and IE 366 and IE 367 and IE 368 and WR 327)) or ((ENGR 322 and (ENGR 391 or ENGR 391H) and ME 250 and (ME 312 or ME 312H) and (ME 317 or ME 317H) and (ME 332 or ME 332H) and ME 383 and WR 327 and (ST 314 or ST 314H)(ENGR 390 or BA 360) and IE 425 and (ME 331 or ME 331H) and ESE 355 and ESE 360

ME 498. ^MIME CAPSTONE DESIGN (4). Product design; selection and replacement of major tools, processes, and equipment; paperwork controls; subsystem revision; system or plant revision; selection and training of personnel; long-run policies and strategy. **CROSSLISTED** as ESE 498 and IE 498. (Writing Intensive Course) **PREREQS:** ESE 497 or IE 497 or ME 497

ME 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ME 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

ME 502. INDEPENDENT STUDIES (1-16). This course is repeatable for a maximum of 16 credits.

ME 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

ME 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

ME 506. PROJECTS (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

ME 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

ME 508. THERMAL FLUID SCIENCE SEMINAR (1). Student participation seminar experience for 1 course credit. Students will present and listen to seminars concerning ongoing research within the thermal fluid sciences.

ME 509. MATERIALS SCIENCE SEMINAR (1). Student participation seminar experience for one credit; students will listen to seminars concerning ongoing research activities within materials science. Students will also have the opportunity to present their own research results periodically. Graded P/N. **CROSSLISTED** as MATS 509.

ME 511. CAD/CAM III (3). Tolerance analysis and application in design/manufacturing practice. Tolerance specification, analysis, ANSI and ISQ standards, computer-based metrology for qualification of parts, management of imperfect geometry through geometric dimensioning and tolerancing. **PREREQS:** Advanced engineering undergraduate or graduate standing.

ME 512. DESIGN OF MECHANISMS (4). Analysis and study of the function, classification, position, velocity, and acceleration of multi-element mechanical linkages and mechanisms. Synthesis of mechanisms for specified multiple point paths, quick return, dwell, and straight-line motion. The lecture will instruct students in the kinematic analysis and synthesis of mechanisms through the use of theory and software packages. The laboratory will familiarize students with a modern mechanism design and animation software package. Lec/lab. **PREREQS:** ME 317

ME 514. MECHATRONICS (4). Focuses on the integration of electronics and use of digital control and microcontroller technology with mechanical systems. Topics cover sensors, actuators, data acquisition and microcontrollers. Lec/lab. **PREREQS:** ME 373 and ME 430

ME 515. RISK AND RELIABILITY ANALYSIS IN ENGINEERING DESIGN (4). Fundamentals of risk, uncertainty, and reliability. Methods to analyze and quantify the risk of failures, and the reliability of complex systems, including fault tree analysis, reliability block diagrams, probabilistic risk assessment. Introduction to research methods for risk and reliability analysis during the early design stages.

ME 516. MODELING AND ANALYSIS OF COMPLEX SYSTEMS (4). Introduction to challenges and considerations when designing complex systems. Fundamentals of systems engineering and methods used in practice. Models and tools used to enable the use of models for trade studies during the design of complex systems. Model-based design environments and methodologies. Introduction to decision support tools in design.

ME 517. OPTIMIZATION IN DESIGN (3). Optimization methods as applied to engineering design, theory and application of nonlinear optimization techniques for multivariate unconstrained and constrained problems. Model boundedness and sensitivity. Not offered every year.

ME 518. THE CONCURRENT DESIGN OF PRODUCTS (3). Concurrent design requires the systematic communication of information across the entire product development and manufacturing enterprise. Focuses on the structure and methods to enable concurrent design. These methods

include the management of design information, quality function deployment (QFS), functional modeling, design for assembly (DFA), parametric design, and others.

ME 519. SELECTED TOPICS IN DESIGN (3-4). Topics in mechanical design selected from the following: design processes, quality engineering, design for assembly, statistical machine design, the Taguchi method, and parametric design. This course is repeatable for a maximum of 32 credits.

ME 520. APPLIED STRESS ANALYSIS (4). Elasticity theory, failure theories, energy methods, finite element analysis. **PREREQS:** ME 316

ME 522. MECHANICAL VIBRATIONS (4). Dynamic response of single and multiple degree-of-freedom systems. **PREREQS:** ME 317

ME 523. ADVANCED STRESS ANALYSIS (4). Analytical and finite element techniques applied to plate/shell structures and to nonlinear problems in stress analysis including plasticity effects, creep, large deflections, buckling and contact mechanics. **PREREQS:** ME 520

ME 524. FINITE ELEMENT MODELING OF MECHANICAL ENGINEERING SYSTEMS (3). Application of modern finite element code in the analysis of complex mechanical engineering systems. Extensive use of engineering workstations. Lec/lab. **PREREQS:** ME 520

ME 526. NUMERICAL METHODS FOR ENGINEERING ANALYSIS (3). Numerical solutions of linear equations, difference equations, ordinary and partial differential equations. **CROSSLISTED** as NE 526. **PREREQS:** Programming experience and previous exposure to numerical methods, or instructor approval.

ME 529. SELECTED TOPICS IN SOLID MECHANICS (3-4). Advanced topics in solid mechanics emphasizing research applications of current interest. This course is repeatable for a maximum of 32 credits.

ME 531. LINEAR MULTIVARIABLE CONTROL SYSTEMS I (4). Theoretical design of control systems for systems modeled by linear multivariable differential equations. Topics covered include controllability, observability, state feedback control, pole placement, output feedback, estimator design, and control designs that include both estimators and regulators.

ME 532. LINEAR MULTIVARIABLE CONTROL SYSTEMS II (4). Focuses on designing control systems where the device to be controlled is an uncertain system, yet can be described by a set of linear differential equations. Lec. **PREREQS:** ME 531 and/or equivalent.

ME 533. NONLINEAR DYNAMIC ANALYSIS (4). Course focuses on understanding the behavior of nonlinear dynamic systems of interest to mechanical engineers. Lec. **PREREQS:** ME 317 or equivalent.

ME 534. NONLINEAR MULTIVARIABLE CONTROL SYSTEMS (4). Focuses on designing control systems when the device to be controlled is mathematically described by a nonlinear set of differential equations. Lec. **PREREQS:** ME 533 and/or equivalent.

ME 535. ADVANCED DYNAMICS (4). A graduate course focused on dynamics of rigid bodies using Newtonian mechanics. Lec. **PREREQS:** ME 317 or equivalent.

ME 536. ACTUATOR DYNAMICS (4). Focuses on how inertia, spring compliance, and other passive dynamics affect highly dynamic, software-controlled systems. Examples include robotic manipulation tasks, robot-human interaction, CNC machines, or legged locomotion. **PREREQS:** ME 535 and Graduate standing or with approval of instructor.

ME 537. LEARNING-BASED CONTROL (4). Provides an introduction to learning systems and their application to the control of nonlinear

systems. Covered topics include neural networks, reinforcement learning, and evolutionary algorithms. Includes project component in which students write a technical paper and give a conference style presentation based on their project.

ME 538. AUTONOMOUS AGENTS AND MULTI-AGENT SYSTEMS (4). Provides an introduction to autonomous agents and multi-agent systems. In particular, it focuses on how to use agents as building blocks for different autonomous systems. Covered topics include reinforcement learning, game theory, swarms, auctions, and collectives. Because this course covers a constantly evolving field, there will be a significant paper reading component in addition to the regular lectures. Students are expected to spend at least three hours a week reading, discussing and critiquing assigned papers.

ME 539. SELECTED TOPICS IN DYNAMICS (1-16). Advanced topics in dynamics emphasizing research applications of current interest. This course is repeatable for a maximum of 30 credits.

ME 544. ADVANCED POWER GENERATION SYSTEMS (4). Thermal mechanical evaluation of modern power generation technologies, including fossil and nuclear Rankine cycle power plants, gas turbines, cogeneration power plants, distributed power generation and fuel cells. Lec/rec. **PREREQS:** ME 312 and (ME 332 or ME 332H)

ME 545. INTRODUCTION TO COMBUSTION (3). Study of combustion science based on the background of chemistry, thermodynamics, fluid mechanics and heat transfer. Stoichiometry, energetics of chemical reactions, flame temperature, equilibrium product analyses, chemical kinetics, and chain reactions. **PREREQS:** ME 312 and (ME 332 or ME 332H)

ME 546. CONVECTION HEAT TRANSFER (3). An advanced treatment of forced and natural convection heat transfer processes emphasizing underlying physical phenomena. Current topical literature will be considered; analytical and numerical problem solving is included. **PREREQS:** (ME 332 or ME 332H) and ME 373

ME 547. CONDUCTIVE HEAT TRANSFER (3). Analytical and numerical solutions to steady state and transient conduction problems. **PREREQS:** (ME 332 or ME 332H) and ME 373

ME 548. RADIATION HEAT TRANSFER (3). Analytical and numerical methods of solution of thermal radiation problems. **PREREQS:** (ME 332 or ME 332H) and ME 373

ME 549. SELECTED TOPICS IN HEAT TRANSFER (3). Topics in heat transfer including advanced problems in conduction, radiation, and convection. Additional examination of heat transfer in multiphase systems, inverse problems, combined modes, equipment design, solution techniques and other topics of current interest considered, including extensive use of current literature. Not all topics covered each year. This course is repeatable for a maximum of 9 credits.

ME 550. APPLIED HEAT TRANSFER (4). An intermediate heat transfer course seeking to lay a foundation for determining the heating and cooling characteristics with a variety of modern and classical processes. Included is design of multi-component heat transfer systems. Lecture, 110 minutes twice per week. **PREREQS:** ME 332 or ME 332H

ME 552. MEASUREMENTS IN FLUID MECHANICS AND HEAT TRANSFER (4). Course emphasis is on measurement techniques and data analysis methods related to fluid mechanics and heat transfer. Proper experimental methods, data and uncertainty analyses related to thermal and fluids measurements are discussed. Local and spatial mapping of fluid and thermal fields are highlighted. **PREREQS:** (ME 331 or ME 331H) and (ME 332 or ME 332H) and ME 451.

ME 553. STRUCTURE AND MECHANICS LABORATORY (4). Techniques for measurement of structural response and material properties. Proper use of rosette strain gauges, load cells, and displacement transducers. Full-field strain measurement using photoelasticity and digital image correlation. Proper implementation of material testing standards. Characterization of anisotropic composite materials. **PREREQS:** ME 451

ME 555. EXPERIMENTAL TECHNIQUES IN MATERIALS SCIENCE (4). Materials processing, characterization, computational and data analysis techniques in materials science. Focus on processing-structure-property relationships. Lec/lab. **CROSSLISTED** as MATS 555. This course is repeatable for a maximum of 8 credits. **PREREQS:** ME 570 and (ENGR 321 or ENGR 321H)

ME 560. INTERMEDIATE FLUID MECHANICS (4). Ideal fluid flow including potential flow theory. Introduction to compressible flow. Viscous flow and boundary layer theory. Introduction to turbulence. **PREREQS:** ME 331 or equivalent.

ME 561. GAS DYNAMICS (4). Studies one-dimensional isentropic flow, nozzles, diffusers, normal and oblique shocks, compressible flow with friction and heating, and an introduction to propulsion systems. **PREREQS:** ME 312 and (ME 331 or ME 331H)

ME 565. INCOMPRESSIBLE FLUID MECHANICS (3). Generalized fluid mechanics; kinematics; methods of description; geometry of the vector field, dynamics of nonviscous fluids, potential motion, two-dimensional potential flow with vorticity.

ME 566. VISCOUS FLOW (3). Boundary layer, stability, transition prediction methods, computational methods in fluid mechanics, recent developments.

ME 567. ENGINEERING APPLICATIONS OF COMPUTATIONAL FLUID DYNAMICS (4). Basic concepts of computational fluid dynamics, a technique used for solving fully three-dimensional fluid flow problems with no exact solution, will be discussed and applied to general engineering applications using commercially available software. Lec. **PREREQS:** ME 312 and (ME 331 or ME 331H)

ME 569. SELECTED TOPICS IN FLUID MECHANICS (2-4). Topics in fluid mechanics emphasizing research applications of current interest. This course is repeatable for a maximum of 32 credits.

ME 570. STRUCTURE PROPERTY RELATIONS IN MATERIALS (4). Fundamentals of the interactions between the structure and properties of materials. Atomic bonding and atom interactions. Geometric and algebraic representations of symmetry. Introduction to phase equilibria. Phenomenological background of elasticity and plasticity in materials. Anisotropic materials and tensor representations. Influence of structure on thermal, electrical, and optical properties of materials. **CROSSLISTED** as MATS 570.

ME 571. ELECTRONIC PROPERTIES OF MATERIALS (4). Development of a quantitative description of the electronic structure of solids starting with the quantum mechanical model of the atom, atomic bonding, and band theory of solids. Quantitative description of the electronic properties of metals, semiconductors, and insulators. **CROSSLISTED** as MATS 571. **PREREQS:** CH 545 or ME 570 or equivalent.

ME 575. NUMERICAL METHODS FOR ENGINEERING ANALYSIS (3). Numerical solutions of linear equations, difference equations, ordinary and partial differential equations. Emphasis on partial differential equation solution techniques relevant to mechanical engineering. **PREREQS:** ME 373

ME 578. THIN FILM MATERIALS CHARACTERIZATION AND PROPERTIES (3). Processing of thin films and characterization of the microstructure; diffusion and solid state reactions; mechanical, magnetic and electronic properties of thin films. **CROSSLISTED** as MATS 578. **PREREQS:** (ENGR 311 or ENGR 311H or ME 311 or ME 311H) and (ENGR 321 or ENGR 321H or MATS 321) and (ENGR 322 or MATS 322)

ME 580. MATERIALS SELECTION (3). Selecting materials for engineering applications. The major families of materials, their properties, and how their properties are controlled; case studies and design projects emphasizing materials selection. Lec/lab. **CROSSLISTED** as MATS 580. **PREREQS:** ENGR 322

ME 581. THERMODYNAMICS OF SOLIDS (4). Thermodynamics of solutions and phase equilibrium. Phase diagrams and invariant reactions. Order and disorder in solutions. Applications to advanced materials development. Lec/lab. **CROSSLISTED** as MATS 581.

ME 582. RATE PROCESSES IN MATERIALS (4). Diffusion in solids, including vacancy and interstitial and short-circuit diffusion. Phase transformations including classic nucleation and growth theory. Applications to materials development. Laboratory will emphasize microstructural evaluation and quantitative metallography. Lec/lab. **CROSSLISTED** as MATS 582.

ME 583. COMPOSITE MATERIALS (3). Fibers and matrices, mechanics of composites, reinforcement and failure mechanisms, properties and applications. Lec/lab. **PREREQS:** ENGR 322

ME 584. ADVANCED FRACTURE OF MATERIALS (4). Fracture mechanics will be used as a basis for predicting failure of materials, understanding failure mechanisms, and identifying causes of failure. Course will include discussion of recent journal articles, experimental demonstrations, and analysis of real fracture data. **CROSSLISTED** as MATS 584. **PREREQS:** ENGR 322 or equivalent is recommended.

ME 585. FATIGUE OF MATERIALS (4). Analyzes the failure of materials by fatigue including how fatigue behavior is characterized, how fatigue failure is predicted, the physical mechanisms responsible for fatigue failure of various materials, and how such behavior is related to the atomic structure and microstructure of the material. **PREREQS:** (ME 570 or MATS 570)

ME 587. DISLOCATIONS, DEFORMATION, AND CREEP (4). The effects of point, line, and planar defects on plastic deformation and creep behavior in solids will be discussed with emphasis on the role of dislocations and vacancies. **CROSSLISTED** as MATS 587. **PREREQS:** ENGR 322 or equivalent.

ME 588. COMPUTATIONAL METHODS IN MATERIALS SCIENCE (4). A broad introduction to important materials science simulation methods. These include molecular dynamics, density functional theory, and Monte Carlo methods. Learning is through a mixture of lecture and hands-on lab projects in which students use computational methods to explore and reinforce fundamental concepts in materials science. Lec/lab. **CROSSLISTED** as MATS 588. **PREREQS:** Experience with Matlab or Mathematica or an equivalent numerical and programming environment.

ME 589. SELECTED TOPICS IN MATERIALS (3). Topics in materials science to correspond to areas of graduate research. Topics will be chosen from the following list: optical materials, dielectrics, oxidation and corrosion, ceramics, thermophysical properties, polymers and viscoelasticity, coatings and thin films. Lec/rec. This course is repeatable for a maximum of 32 credits.

ME 596. SELECTED TOPICS IN THERMODYNAMICS (3). Topics in thermodynamics including advanced problems in classical thermodynamics and statistical thermodynamics of current interest. Topics will likely be considered, including extensive use of literature. Not all topics covered each year. This course is repeatable for a maximum of 32 credits.

ME 597. RESEARCH IN MECHANICAL ENGINEERING (3). Research topics in mechanical engineering that are of current interest and that may involve multiple specialty areas. Not offered every year. This course is repeatable for a maximum of 6 credits.

ME 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 32 credits.

ME 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

ME 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** PhD students only.

ME 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** PhD students only.

ME 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** PhD students only.

ME 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** PhD students only.

ME 611. MODERN PRODUCT DESIGN (4). Modern product development, design and prototyping are covered. Product development and prototyping is examined from a research standpoint in this course. Customer outcomes gathering, functional modeling, product architecture, modern techniques for concept generation and selection are explored. Also covered are recently developed theories and techniques for prototyping. The topics' place in the overall design process is shown through a product development and prototyping project.

ME 667. COMPUTATIONAL FLUID DYNAMICS (3). Application of modern computational techniques to solve a wide variety of fluid dynamics problems including both potential and viscous flow with requirements for computer code development. **PREREQS:** ((ME 560 or ME 565 or ME 566) and ME 575) and /or equivalent.

ME 671. ELECTRONIC PROPERTIES OF OXIDES (4). Band theory of solids applied to metal oxide materials. Includes metallic oxides, non-stoichiometric semiconductors and associated defect chemistry, high temperature superconductors, electrostatics, linear dielectrics, non-linear dielectrics, piezoelectrics, and the optical properties of oxides. **CROSSLISTED** as MATS 671. **PREREQS:** ME 571 or MATS 571 or PH 575

■ MANUFACTURING ENGINEERING COURSES

MFGE 285. INTRODUCTION TO INDUSTRIAL AND MANUFACTURING ENGINEERING (3). Introduction to selected topics in industrial and manufacturing engineering, including history and philosophy, product design and manufacturing cycle, integrated role of engineering and business, and multi-objective nature of organizations. Surveys of selected design problems in resource allocation, operations and quality management, and production engineering. **CROSSLISTED** as IE 285.

MFGE 336. PRODUCTION ENGINEERING (4). Students will develop a general understanding of the production engineering function within industry. Geometric dimensioning and tolerancing, process design, and fixture and a gauge design will be introduced and explored through the application of machining processes. Students will also develop an understanding of sustainable manufacturing.

Lec/lab. **PREREQS:** (ENGR 213 and ENGR 248 and (ENGR 321 or ENGR 321H) and ME 250 and ME 382)

MFGE 337. MATERIALS AND MANUFACTURING PROCESSES (4). Materials only become useful when they are made into products. Course focuses on introduction to methods by which materials can be processed into different shapes. The overall goal is to develop an understanding of how a process involves considering the shape of a product as well as the materials it is to be made from. Lec/lab. **PREREQS:** ((ENGR 321 or ENGR 321H) and ME 250)

MFGE 436. LEAN MANUFACTURING SYSTEMS ENGINEERING (4). The planning, evaluation, deployment, and integration of lean manufacturing theory and methods. Examines manufacturing processes/equipment and systems, e.g. planning/control, product design, supply chain resource management. Lec/lab.

MFGE 438. COMPOSITES MANUFACTURING (4). Introduction to fiber-reinforced composite materials and their applications. Topics include matrices and reinforcement; open and closed molding processes; filament winding, quality, testing, damage assessment; basics of factory operations and sustainability of composites. Students will complete laboratory projects using fiber-reinforced laminates. Lec/lab. **PREREQS:** (ENGR 213 or ENGR 213H)

MFGE 499. SPECIAL TOPICS (1-5). This course is repeatable for a maximum of 99 credits.

MFGE 531. MESO-SCALE MANUFACTURING (3). Meso-scale processing techniques for fabricating microfluidic devices, especially microtechnology-based energy, chemical and biological systems. Introduction to microlamination and techniques for lamina patterning, registration and bonding. Lec/lab. **PREREQS:** Graduate standing in science or engineering.

MFGE 534. CERAMICS PROCESSING (3). Introduction to materials, manufacturing methods, properties and applications of ceramics. The emphasis of the course is on understanding and exploring the inter-relationships between material characteristics, processing variables and component geometry in the context of ceramics. **PREREQS:** Graduate standing in engineering or science, or senior standing in manufacturing engineering.

MFGE 535. INDUSTRIAL SUSTAINABILITY ANALYSIS (3). Students are exposed to the role of business and engineering in the design and implementation of sustainable industrial systems. Drivers, metrics, and analysis concepts, methods, and tools are introduced. Students incorporate business and engineering considerations in making product, manufacturing process, and supply chain design considerations. **PREREQS:** Graduate standing or instructor approval.

MFGE 536. LEAN MANUFACTURING SYSTEMS ENGINEERING (4). The planning, evaluation, deployment, and integration of lean manufacturing theory and methods. Examines manufacturing processes/equipment and systems, e.g. planning/control, product design, supply chain resource management. Lec/lab.

MFGE 538. COMPOSITES MANUFACTURING (4). Introduction to fiber-reinforced composite materials and their applications. Topics include matrices and reinforcement; open and closed molding processes; filament winding, quality, testing, damage assessment; basics of factory operations and sustainability of composites. Students will complete laboratory projects using fiber-reinforced laminates. Lec/lab. **PREREQS:** (ENGR 213 or ENGR 213H)

MFGE 599. SPECIAL TOPICS (1-5). This course is repeatable for a maximum of 99 credits. **PREREQS:** Graduate standing only.

■ MECH/IND/MFG COURSES

MIME 101. INTRODUCTION TO MIME (3). Provides students with an overview of mechanical, industrial, manufacturing, and energy systems engineering careers and an introduction to technical areas of study. Skills necessary for success in both the academic curriculum and in the engineering profession will also be emphasized, including communication and ethics. Lec/rec.

MIME 199. SPECIAL TOPICS (1-4).

The College of Forestry at Oregon State University is one of the world's premier education, research, and outreach institutions that focuses on broad areas related to forest resources, terrestrial systems, wood products, ecosystem services, recreation, tourism, and their management.

We provide our graduates with an understanding of the complexity of forests and the economic and social systems that depend upon them; to work with nature to keep land healthy for future generations; to know the science, technology and business associated with managing, and using forests and related resources; and to work effectively with others in a culturally diverse, global society.

The OSU College of Forestry has educated students for over 100 years. We offer a breadth of undergraduate and graduate programs that prepare students for a variety of careers in the public and private sectors. Our programs are ranked among the very best in the world. Our world-class faculty and modern facilities, combined with remarkable access to local forests, private industries, public agencies, international travel, and research through paid internships, cooperative education, and mentored work experiences, provide our students with necessary knowledge and skills for fulfilling careers.

DEGREES AND ACCREDITATIONS

The college offers Bachelor of Science (BS, HBS) degrees in Forest Engineering, Forestry, Recreation Resource Management, Renewable Materials, and Tourism and Outdoor Leadership; and, in coordination with the College of Engineering, a double degree in Forest Engineering-Civil Engineering. We also coordinate the interdisciplinary degree in Natural Resources.

The college also offers forestry specializations within the BS degrees in Environmental Sciences and Bioresource Research.

BS degrees in Forestry, Forest Engineering, and Forest Engineering-Civil Engineering are accredited by the Society of American Foresters (SAF). In addition, the BS degree in Forest Engineering and the BS double degree in Forest Engineering-Civil Engineering are accredited by the Engineering Accreditation Commission of ABET, www.abet.org. The BS degree in Renewable Materials is accredited by the Society of Wood Science and Technology (SWST).

Graduate programs in Sustainable Forest Management, Forest Ecosystems and Society, and Wood Science and Engineering include the Master of Forestry (MF), Master of Science (MS), and Doctor of Philosophy (PhD). Each department also participates in the Master of Arts in

Interdisciplinary Studies (MAIS). The college also offers an online-only Master of Natural Resources (MNR) and an online-only graduate certificate in Sustainable Natural Resources (SNR). We also actively participate in the Peace Corps Master's International (PCMI) program for students interested in combining Peace Corps experience with a master's degree.

CONCURRENT DEGREES: INTERNATIONAL, EDUCATION, AND SUSTAINABILITY

Undergraduates with majors in the College of Forestry also can earn secondary degrees in International Studies, Sustainability, or Education. For additional information, see the International Programs section or the College of Education section of this catalog.

MINORS

The college offers minors in Forestry, Recreation Resource Management, Natural Resources, Renewable Materials, and Tourism and Outdoor Leadership.

HIGH SCHOOL PREPARATION

Students planning to study at Oregon State University should include the following subjects in their high school programs: English, 4 years; mathematics, 3 years; science, 3 years (to include at least one year each of two different sciences—biology, chemistry, physics, etc.); social studies, 3 years; and foreign language, 2 years.

TRANSFER STUDENTS

Because of the technical and professional nature of the college's curricula, the college reserves the right to determine whether courses taken at another institution satisfy the college's curricular requirements. In general, equivalent college-level courses successfully completed at an accredited college or university are accepted. OSU students requesting transfer to the College of Forestry must be a student in good academic standing at the university. Please contact the Student Services Office at 541-737-1594 for additional information.

ADVISING

The College of Forestry is committed to helping students succeed. Students meet with an advisor each term. Advisors are valuable sources of information about degree program options and choices, mentoring, and other special opportunities in line with students' interests. Advising personnel in the college's Student Services Office are also available to help with university rules and regulations, job placement, exchange programs, and referrals to cross-campus programs and services. Students are encouraged to take an active role in their program planning, and to use their time at OSU to develop themselves both academically and professionally.

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The college and the OSU Career Services Center provide up-to-date information for both seasonal and permanent work and offer a full array of career services to prepare undergraduates and graduates for jobs.

EDUCATION FACILITIES

Peavy and Richardson Halls contain modern classroom, laboratory, computer, and study facilities that support learning. We also offer a Self-Learning Center where students have access to educational materials, computers, and group study sessions. Our Wood Innovation Center promotes great relationships between students, employers, and faculty.

Classes use the nearby college forests for field instruction and research projects. In addition to the 11,500 acres in the McDonald-Dunn Forests, the college manages other forests in Oregon for education and research.

The college also makes extensive use of various public and private programs and facilities for student benefit. Numerous field trips to forests, wood processing and manufacturing operations, recreation facilities, and research sites enable students to observe contemporary problems and practices.

Corvallis is one of the largest forestry and wood science research centers in the world. An innovative research program is conducted by the college through its Forest Research Laboratory and by the campus-based Forest Sciences Laboratory of the U.S. Forest Service. These organizations offer state-of-the-art facilities for educational and employment opportunities for superior students.

A Forest Products Collection contains approximately 2,500 species of wood, primarily from North and South America, Southeast Asia, and Africa, while the grounds around the college are planted with an extensive collection of Pacific Northwest trees and shrubs.

STUDENT ACTIVITIES

Numerous opportunities exist for students to get involved in social and academic forestry activities, sports logging, and international travel. Clubs and student chapters of several professional societies are active in the college, as well as Xi Sigma Pi and Alpha Zeta, two national honorary societies to which College of Forestry students may belong. These clubs offer students the chance to develop leadership and team-building skills.

SCHOLARSHIPS

The College of Forestry offers scholarships to our most commendable undergraduate students. Most are merit-based and range in value from \$1,000 to \$9,000, with total awards averaging approximately \$500,000 per year. Online applications are available at <http://studentservices.forestry.oregonstate.edu/scholarships> and are due February 15 of each year.

Graduate students are commonly supported with teaching and research assistantships, as well as fellowships with awards totaling an average of \$100,000 per year. Information is available at <http://www.forestry.oregonstate.edu/fellowships>.

Scholarships and fellowships are awarded each spring for the following academic year.

GRADUATION

Academic Requirements

To earn a bachelor of science degree, a student must complete 180 quarter credits of university-level courses for the Forestry, Recreation Resource Management, Renewable Materials, and Tourism and Outdoor Leadership programs, 192 quarter credits of university-level courses for the BS in Forest Engineering, and 242 for the BS in Forest Engineering and Civil Engineering. These curricula include:

- Written and oral communications, 13 credits including a senior writing intensive course.
- OSU Baccalaureate Core curriculum.
- Completion of an approved departmental curriculum.
- Students majoring in, Recreation Resource Management, Renewable Materials, and Tourism and Outdoor Leadership must earn grades of C- or better in all required forestry courses (with FE, FOR, FES, FS, TOL, WSE course designators or crosslisted courses or approved substitutions for majors, minors and options). Students majoring in Natural Resources must earn a C- or better in upper-division core or breadth courses.
- Forestry, Forest Engineering, and Forest/Civil Engineering majors must earn grades of C or better in all required forestry courses or approved substitutions for majors, minors and options.

- No courses used to complete major requirements in Forest Engineering, Forest/Civil Engineering, Forestry, Recreation Resource Management, Tourism and Outdoor Leadership, and Renewable Materials can be taken with S/U grading. Natural Resources majors can take up to two S/U graded courses in their core, breadth, or option.
- All undergraduate College of Forestry courses serving as prerequisites for other undergraduate College of Forestry courses must be completed with a grade of C, C- or better, depending on the program.
- Approved work experience as noted below.

PROFESSIONAL AND PERSONAL REQUIREMENTS

Those majoring in Forest Engineering, Forest Engineering-Civil Engineering, Forestry, Recreation Resource Management, and Renewable Materials must complete six months of satisfactory employment in an area related to their major. Forestry students may opt into our Cooperative Education program, which requires two six-month internships with our external partners. Those majoring in Tourism and Outdoor Leadership must satisfactorily complete a supervised internship.

Students are personally responsible for fulfilling all curricular requirements in proper sequence. Work performance and personal conduct are thoroughly appraised by the college. Since the profession of forestry is highly regarded for its ethical and academic standards, students are responsible for observing the Professional Code of Conduct of the college in its entirety. Departure from these ethical requirements may be reason for removing a student from the college.

FOREST ECOSYSTEMS AND SOCIETY

James E. Johnson, *Interim Head*
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FACULTY

Professors Albers, Bliss, Bondi, Doescher, Harmon, Hibbs, Jensen, Lachenbruch, Law, Oester, Puettmann, K.N. Johnson, R. Johnson, Nelson, Ripple, Ross, Salwasser, Shelby, Shindler, Strauss, Turner

Associate Professors Betts, Creighton, Ganio, Howe, Krankina, Lindberg, Needham, Reuter, Rosenberger, Tynon, Withrow-Robinson

Assistant Professors Campbell, Grotta, Luoma, Morzillo, Schulze, Still

Senior Instructors Anzinger, Reed, Strong, Zahler

Instructors Ahrens, Bishaw, Gassner, Grimm-Greenblatt, Mangla, Olsen, Perry, Stemper, Tilt, Wheeler

ADJUNCT FACULTY

Achterman, J. Jones, Joslin, Klemm, Lach, Lajtha, Lunch, McIver, Myrold, Tesch, Unsworth, Walker

COURTESY/AFFILIATE FACULTY

Alexander, Bormann, Brooks, Castellano, Cazes-Gonzalez, Cohen, Cotton, Endress, Erickson, Fischer, Gray, Greathouse, Hollenbeck, Joseph, R. Kennedy, Lurie, Mc Culloh, McCullon, McKane, Meinzer, Perakis, Phillips, Pyke, Ries, Schmieding, Spies, Swanson, Taylor, Tinus, Wallin, Wondzell, Woodruff

Undergraduate Majors

Natural Resources (BS, CRED, HBS)

This program is an interdisciplinary offering of the colleges of Agricultural Sciences, Forestry, Liberal Arts, and Science but is administered within Forestry.

Options

*Arid Land Ecology
Ecological Restoration
Fish and Wildlife Conservation
Forest Ecosystems
Geosciences and Natural Resources
Human Dimensions in Natural Resources
Individualized Specialty Option
Law Enforcement in Natural Resources
Native Americans and Natural Resources
Natural Resource Education
Natural Resources Conservation and Technology
Natural Resource Policy and Management
Recreation and Tourism Management*

*Resource Conservation
Soil Resources
Sustainable Agroforestry
Urban Forest Landscapes
Watershed Management
Wildland Fire Ecology*

Recreation Resource Management (BS, CRED, HBS)

Options

*Cultural Resource Management
Environmental Resource Interpretation
Forest Resources
Law Enforcement
Park Landscapes
Public Policy
Resource Planning
Sociology
Tourism*

Sustainability (BS, HBS)

This program is available from all colleges that offer undergraduate majors. It is managed by the Department of Forest Ecosystems and Society.

Tourism and Outdoor Leadership (BS)

(Offered only on OSU-Cascades Campus.)

Options

*Adventure Leadership and Education
Eco and Adventure Tourism
International Ecotourism
Recreation Management*

Undergraduate Minors

Natural Resources

(See Interdisciplinary Programs)

Recreation Resource Management

Tourism and Outdoor Leadership

Graduate Majors

Forest Ecosystems and Society

(MAIS, MF, MS, PhD)

Graduate Areas of Concentration

*Forest Biology (MF only)
Forest, Wildlife and Landscape Ecology
Genetics and Physiology
Integrated Social and Ecological Systems
Silviculture (MF only)
Science of Conservation, Restoration and Sustainable Management
Social Science, Policy, and Natural Resources
Soil-Plant-Atmosphere Continuum
Sustainable Recreation and Tourism*

Master of Natural Resources (MNR)

Graduate Areas of Concentration

*Fisheries Management
Geographic Information Systems
Marine Resources Management
Sustainable Natural Resources
Water Conflict Management and Transformation*

Affiliated Interdisciplinary Graduate Major

Applied Economics (MA, MS, PhD)

(See Graduate School)

Graduate Minor

Forest Science

Graduate Certificate

Sustainable Natural Resources

The faculty, staff and students in the Department of Forest Ecosystems and Society are dedicated to the discovery and dissemination of knowledge related to the interactions among forests, people and other organisms. Humans are dependent on forests in many ways. We seek to understand the diversity of benefits derived from forests and expand our knowledge of how forests function to provide those benefits. We provide the expertise needed by scientists, managers, and the general public as they jointly decide how these values can be sustained in the face of climate change, land use pressures and economic uncertainties. Our goal is to contribute to decisions that lead to sustaining these important values on forestlands in Oregon, in the U.S., and around the globe now and into the foreseeable future.

The Department of Forest Ecosystems and Society offers a graduate program in Forest Ecosystems and Society. The program includes Master of Forestry (MF), Master of Science (MS), and Doctor of Philosophy (PhD) degrees. The department also offers an online-only Master of Natural Resources (MNR) degree and an online-only graduate certificate in Sustainable Natural Resources.

RESEARCH

Research in the Department of Forest Ecosystems and Society focuses on fundamental and applied research to support forest resource management decisions. All biological levels of organization within natural and managed forest communities, including interactions with human populations, are addressed by current departmental research projects. Emphasis in graduate education is placed on the ability to define and solve researchable problems. Graduate students are encouraged to participate actively in the department's large, diverse program of seminars, continuing education courses and workshops, international research, and other professional and educational activities.

FOREST ECOSYSTEMS AND SOCIETY GRADUATE DEGREE PROGRAMS

The **MS and PhD degrees in Forest Ecosystems and Society** are structured specifically for those interested in careers in research, teaching, and specialized areas of forest science, social science, and the interface of the two. The degrees are available in seven areas of concentration: forest, wildlife and landscape ecol-

ogy; genetics and physiology; integrated social and ecological systems; science of conservation, restoration and sustainable management; social science, policy, and natural resources; soil-plant-atmosphere continuum; sustainable recreation and tourism.

The **Master of Forestry degree** is a nonthesis degree that supports advancement in non-research professional forestry and forestry-related professional positions. The degree emphasizes one of two areas: biology or silviculture. Students in either area prepare for careers as professional forest biologists, silviculturists, or pest managers capable of analyzing opportunities for natural resource management for landowners. This degree typically takes 12–15 months to complete and requires the student work on a capstone project.

The **Master of Natural Resources (MNR) degree** is offered as a non-thesis option only, similar to a Master of Business Administration, Master of Agriculture, or Master of Forestry. The MNR curriculum facilitates learning by natural resource professionals who work in settings that require cross-disciplinary competency to find solutions to natural resource problems. The MNR is taught entirely online through OSU Ecampus (although it may be possible for some students to work toward the MNR degree while in-residence at OSU).

INTERDISCIPLINARY GRADUATE DEGREE PROGRAMS

The Department of Forest Ecosystems and Society participates in a number of other interdisciplinary graduate degree programs at OSU, including the Master of Arts in Interdisciplinary Studies (MAIS), Environmental Sciences, Water Resources, and Applied Economics.

UNDERGRADUATE MAJORS WITH OPTIONS

NATURAL RESOURCES (BS, CRED, HBS)

Paul Doescher, *Director*
Connie Patterson, *Program Coordinator*

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Oregon State University
Corvallis, OR 97331-5703
541-737-9135
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Undergraduate Major

Natural Resources (BS, HBS)

— A collaborative program offered by the colleges of Forestry, Agricultural Sciences, Science, and Liberal Arts. It is administered by the College of Forestry.

Options

Arid Land Ecology
Ecological Restoration
Fish and Wildlife Conservation
Forest Ecosystems
Geosciences and Natural Resources
Human Dimensions in Natural Resources
Individualized Specialty Option
Law Enforcement in Natural Resources
Native Americans and Natural Resources
Natural Resource Education
Natural Resources Conservation and Technology
Natural Resource Policy and Management
Recreation and Tourism Management
Resource Conservation
Soil Resources
Sustainable Agroforestry
Urban Forest Landscapes
Watershed Management
Wildland Fire Ecology

Minor

Natural Resources

Students who graduate with a BS degree in Natural Resources from OSU should be able to integrate technical “field” skills with analytical skills to solve important natural resource problems. The curriculum is designed to help students acquire knowledge enabling them to understand a range of natural resource issues, work with experts in a variety of resource fields, and deal with social and political components of resource management. This program is an interdisciplinary offering supported by the colleges of Agricultural Sciences, Forestry, Liberal Arts, and Science. It is administered by the College of Forestry.

In addition to the baccalaureate core, the three main areas for course work include: the natural resources core (74 credits), breadth requirements (21 credits), and the specialty option (40 credits). Within these areas, students have a number of courses to choose from to fulfill requirements. Students acquire knowledge and background in physical and biological systems, math and statistics, natural resource policy, ecology, economics, and decision making. Breadth is acquired in seven key areas of resource management. Finally, students develop depth in the specialty option, choosing from a number of pre-approved options, or creating an individualized specialty option.

Only two courses used to complete the natural resources major requirements may be taken S/U. Grades of C– or better are required in upper-division natural resources core courses, plus all breadth requirements.

The Natural Resources major is also available at the OSU-Cascades Campus in Bend, the OSU Agricultural Program at

Eastern Oregon University, and through the OSU Extended Campus program.

Core and Breadth Requirements for the Natural Resources (BS):

Natural Resources Core (74)

Animal ID

Choose one course from below:

FW 312. Systematics of Birds (2)
FW 316. Systematics of Fishes (2)
FW 318. Systematics of Mammals (2)
Z 477. Aquatic Entomology (4)

Atmospheric Science

Choose one course from below:

ATS 210. Introduction to the Atmospheric Sciences (3)
ATS 320. *The Changing Climate (3)
GEO 323. ^Climatology (4)

Biology

BI 101, BI 102, BI 103. *General Biology (4,4,4)
or BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

Career Development

FES 207. Career Development (1)

Chemistry

CH 121. General Chemistry (5)
or CH 231. *General Chemistry (4) **and**
CH 261. *Laboratory for Chemistry 231 (1)

Communications

Choose one course from below:

COMM 321. Introduction to Communication Theory (3)
COMM 328. Nonverbal Communication (3)
COMM 385. Communication and Culture in Cyberspace (3)
COMM 440. Theories of Conflict and Conflict Management (3)
COMM 442. Bargaining and Negotiation Processes (3)
FES 360. Collaboration and Conflict Management (3)
FES 493. Environmental Interpretation (4)

Earth Science

Choose one course from below:

GEO 101. *The Solid Earth (4)
GEO 102. *The Surface of the Earth (4)
GEO 201. *Physical Geology (4)
GEO 202. *Earth Systems Science (4)
GEO 221. *Environmental Geology (4)

Environmental Assessment and Planning

Choose one course from below:

ANS/FES/FW/SOC 485. *Consensus and Natural Resources (3)
FES 356. Recreation Resource Planning (4)
FES/FW 445. Ecological Restoration (4)
FOR 459. Forest Resource Planning and Decision Making (4)
FW 435. ^Wildlife in Agricultural Ecosystems (3)
GEO 423. Land Use in the American West (3)
NR 350. *Sustainable Communities (4)
PS 449. ^Topics in Comparative Politics (4)
PS 477. International Environmental Politics and Policy (4)
RNG 421. Wildland Restoration and Ecology (4)
RNG 490. Rangeland Management Planning (4)

General Ecology**Choose one course from below:**

- BI 370. Ecology (3)
 BI 306H. [^]Environmental Ecology (3)
 BOT 341. Plant Ecology (4)
 FES 240. ^{*}Forest Biology (4)
 FES 341. Forest Ecology (3)

GIS**Choose one course from below:**

- FE 257. GIS and Forest Engineering Applications (3)
 FOR 421. Spatial Analysis of Forested Landscapes (3)
 FW 303. Survey of Geographic Information Systems in Natural Resource (3)
 GEO 365. Introduction to Geographic Information Systems (4)
 GEO 465. Geographic Information Systems and Science (4)
 HORT 414. Information Systems in Agriculture (4)

Managing Natural Resources for the Future

- NR 201. Managing Natural Resources for the Future (3)
 or Seminars—Natural Resources (1)+(1)

Mathematics**Choose one course from below:**

- MTH 112. ^{*}Elementary Functions (4)
 MTH 241. ^{*}Calculus for Management and Social Science (4)
 MTH 245. ^{*}Mathematics for Management, Life, and Social Sciences (4)
 MTH 251. ^{*}Differential Calculus (4)

Measurements**Choose one course from the area most related to student's interests:****Biological/Physical Science**

- BI 371. [^]Ecological Methods (3)
 BOT 440. Field Methods in Plant Ecology (4)
 FES 422. Research Methods in Social Science (4)
 FOR 321. Forest Mensuration (5)
 FW 255. Field Sampling of Fish and Wildlife (3)
 GEO 451. Environmental Site Planning (3)
 HDFS 361. Applied Research Methods (4)
 RNG 441. Rangeland Analysis (4)
 SOC 418. Qualitative Research Methods (4)

Social Science

- FES 422. Research Methods in Social Science (4)
 HDFS 361. Applied Research Methods (4)
 SOC 418. Qualitative Research Methods (4)

Natural Resource Decision Making

- NR 455. Natural Resource Decision Making (4)

Natural Resource Policy**Choose one course from below:**

- FOR 460. [^]Forest Policy (4)
 FOR 462. Natural Resource Policy and Law (3)
 GEO/SOIL 335. ^{*}Introduction to Water Science and Policy (3)
 PS 475. Environmental Politics and Policy (4)
 PS 477. International Environmental Politics and Policy (4)

Resource Economics**Choose one course from below:**

- AREC 351. ^{*}Natural Resource Economics and Policy (3)
 AREC 352. ^{*}Environmental Economics and Policy (3)
 FES 432. Economics of Recreation Resources (4)
 FOR 330. Forest Resource Economics I (4)

Society and Natural Resources**Choose one course from below:**

- ANTH 110. ^{*}Introduction to Cultural Anthropology (3)
 FES 251. Recreation Resource Management (4)
 FES 355. Management for Multiple Resource Values (3)
 FES/FS 492. Ecosystem Services Ecology, Sociology, Policy (3)

Soil Science

- CSS 205. ^{*}Soil Science (4) [*Taught at EOU LaGrande campus only.*]
 or CSS 305. Principles of Soil Science (4) [*Taught at EOU La Grande campus only.*]
 or SOIL 205. ^{*}Soil Science (4)

Statistics**Choose one course from below:**

- ST 201. Principles of Statistics (4)
 ST 351. Introduction to Statistical Methods (4)

Vegetation ID**Choose one course from below:**

- BOT 321. Plant Systematics (4)
 BOT 414. Agrostology (4)
 BOT 425. Flora of the Pacific Northwest (3)
 FES 141. Tree and Shrub Identification (3)
 FES 241. Dendrology (5)
 HORT 226. Landscape Plant Materials I: Deciduous Hardwoods and Conifers (4)
 HORT 228. Landscape Plant Materials II: Spring Flowering Trees and Shrubs (4)
 RNG 353. Wildland Plant Identification (4)

Water Science**Choose one course from below:**

- FE 430. Watershed Processes (4)
 FW 326. Integrated Watershed Management (3)
 RNG 355. Desert Watershed Management (3)
 OC 331. Introduction to Oceanography (3)
 OC 332. Coastal Oceanography (3)

Note: Particular option programs may specify additional core courses to assure that students meet prerequisites for option courses, or develop background in fields important for the option. Students should not assume that the core courses listed above include all of the necessary background in science or math for every option.

Breadth (21)**Students must complete one course from each of the following groups:****Fisheries and Wildlife (Choose one)**

- FOR/FW/RNG 346. Topics in Wildland Fire (3)
 FES/FW 445. Ecological Restoration (4)
 FOR/FW/RNG 446. Wildland Fire Ecology (3)
 FW 311. Ornithology (3)
 FW 315. Ichthyology (3)

- FW 317. Mammalogy (3)
 FW 320. Introductory Population Dynamics (4)
 FW 321. Applied Community and Ecosystem Ecology (3)
 FW 323. Management Principles of Pacific Salmon in the NW (3)
 FW 350. ^{*}Endangered Species, Society and Sustainability (3)
 FW 427. Principles of Wildlife Diseases (4)
 FW 435. [^]Wildlife in Agricultural Ecosystems (3)
 FW 451. Avian Conservation and Management (5)
 FW 453. Forest Management and Wildlife Conservation (3)
 FW 454. [^]Fishery Biology (4)
 FW 458. Mammal Conservation and Management (4)
 FW 465. Marine Fisheries (4)
 FW 473. Fish Ecology (4)
 FW 481. Wildlife Ecology (4)

Forestry (Choose one)

- BOT/FES 415. Forest Insect and Disease Management (5)
 FE 370. Harvesting Operations (4)
 FES 341. Forest Ecology (3)
 FES 342. Forest Types of the Northwest (3)
 FES/HORT 350. Urban Forestry (3)
 FES/FW 445. Ecological Restoration (4)
 FOR/FW/RNG 346. Topics in Wildland Fire (3)
 FOR/RNG 436. Wildland Fire Science and Management (4)
 FOR 441. Silviculture Principles (4)
 FOR/FW/RNG 446. Wildland Fire Ecology (3)
 FOR/FE 456. ^{*}International Forestry (3)
 FOR 457. Techniques for Forest Resource Analysis (4)
 FOR 459. Forest Resource Planning and Decision Making (4)
 FOR 460. [^]Forest Policy (4)
 FS/NR/RNG 477. ^{*}Agroforestry (3)
 FW 453. Forest Management and Wildlife Conservation (3)
 WSE 470. ^{*}Forests, Wood, and Civilization (3)

Land and Water (Choose one)

- CSS/SOIL 395. ^{*}World Soil Resources (3)
 CSS/SOIL 466. Soil Morphology and Classification (4)
 FE 430. Watershed Processes (4)
 FW 456. Limnology (5)
 FW 479. Wetlands and Riparian Ecology (3)
 GEO 306. ^{*}Minerals, Energy, Water, and the Environment (3)
 GEO 307. ^{*}National Park Geology and Preservation (3)
 GEO 308. ^{*}Global Change and Earth Sciences (3)
 GEO/SOIL 335. ^{*}Introduction to Water Science and Policy (3)
 GEO 424. International Water Resources Management (3)
 GEO 425. Water Resources Management in U.S. (3)
 GEO 429. Topics in Resource Geography (3)
 RNG 355. Desert Watershed Management (3)
 RNG 455. Riparian Ecology and Management (3)

Political Dimensions (Choose one)

- ANS/FES/FW/SOC 485. ^{*}Consensus and Natural Resources (3)

AREC 432. Environmental Law (4)
 AREC/PS/SOC 407. Seminar: Current Issues in Rural Policy (4)
 BI 301. *Human Impacts on Ecosystems (3)
 FES 351. Recreation Behavior and Management (4)
 FES 352. Wilderness Management (3)
 FES 365. *Issues in Natural Resources Conservation (3)
 FES 454. Managing at the Wildland-Urban Interface (3)
 FOR 462. Natural Resource Policy and Law (3)
 FW 325. *Global Crises in Resource Ecology (3)
 FW 350. *Endangered Species, Society and Sustainability (3)
 GEO 300. *Sustainability for the Common Good (3)
 GEO/SOIL 335. *Introduction to Water Science and Policy (3)
 GEO 423. Land Use in the American West (3)
 HST 481. *Environmental History of the United States (4)
 PS 449. ^Topics in Comparative Politics: Environmental Politics and Policy (4)
 PS 475. Environmental Politics and Policy (4)
 PS 476. *Science and Politics (4)
 PS 477. International Environmental Politics and Policy (4)
Range (Choose one)
 FOR/FW/RNG 346. Topics in Wildland Fire (3)
 FOR/RNG 436. Wildland Fire Science and Management (4)
 FES/FW 445. Ecological Restoration (4)
 FOR/FW/RNG 446. Wildland Fire Ecology (3)
 RNG 341. Rangeland Ecology and Management (3)
 RNG 351. Range Ecology I-Grasslands (3)
 RNG 352. Range Ecology II-Shrublands (3)
 RNG 421. Wildland Restoration and Ecology (4)
 RNG 441. Rangeland Analysis (4)
 RNG 442. Rangeland-Animal Relations (4)
 FS/NR/RNG 477. *Agroforestry (3)
 RNG 490. Rangeland Management Planning (4)
Resource Values/Philosophy (Choose one)
 AG 301. *Ecosystem Science of Pacific NW Indians (3)
 ANTH 481. *Natural Resources and Community Values (3)
 ANTH 482. *Anthropology of International Development (4)
 FES 453. Nature-Based Tourism (3)
 FW 340. *Multicultural Perspectives in Natural Resources (3)
 GEO 309. *Environmental Justice (3)
 GEO 420. Geography of Resource Use (3)
 HST 481. *Environmental History of the United States (4)
 PHL 440. Environmental Ethics (3)
 PHL 443. *World Views and Environmental Values (3)
Social Issues (Choose one)
 ANS/FES/FW/SOC 485. *Consensus and Natural Resources (3)
 ANTH 330. *Evolution of People, Technology, and Society (3)
 FES 351. Recreation Behavior and Management (4)
 FES 352. Wilderness Management (3)

FES 453. Nature-Based Tourism (3)
 FES 492. Ecosystem Services Ecology, Sociology, Policy (3)
 FES 493. Environmental Interpretation (4)
 FOR 371. Eco and Adventure Tourism (3) [*Cascades Campus only*]
 FOR 459. Forest Resource Planning and Decision Making (4)
 SOC 360. *Population Trends and Policy (4)
 SOC 424. Social Psychology (4)
 SOC 454. *Leisure and Culture (4)
 SOC 456. *Science and Technology in Social Context (4)
 SOC 475. Rural Sociology (4)
 SOC 480. *Environmental Sociology (4)
 SOC 481. *Society and Natural Resources (4)
 SOC/ANS/FW 485. *Consensus and Natural Resources (3)
 WGSS 440. *Women and Natural Resources (3)

Footnotes:

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

OPTIONS**ARID LAND ECOLOGY OPTION**

The student pursuing this option will develop the skills and knowledge necessary to manage natural resources in the arid lands of western North America.

No more than 20 credits from one department; no more than 20 lower-division credits.

Courses in Rangeland Resources (18 credits)

RNG 341. Rangeland Ecology and Management (3)
 RNG 352. Range Ecology II-Shrublands (3)
 RNG 353. Wildland Plant Identification (4)
 RNG 421. Wildland Restoration and Ecology (4)
 RNG 442. Rangeland-Animal Relations (4)

Courses in Animals, Plants, Soils, and Ecology (23 credits)

BOT 313. Plant Structure (4)
 BOT 321. Plant Systematics (4)
 BOT 414. Agrostology (4)
 CSS/SOIL 466. Soil Morphology and Classification (4)
 FOR/RNG 436. Wildland Fire Science and Management (4)
 FOR/FW/RNG 446. Wildland Fire Ecology (3)

Additional courses required in Natural Resources Core and Breadth:

RNG 441. Rangeland Analysis (4)
 RNG 490. Rangeland Management Planning (4)

Total=41**ECOLOGICAL RESTORATION OPTION**

This option will help students understand complexities associated with restoration of terrestrial and aquatic ecosystems, and how restoration decisions involve significant interactions between ecological and social systems.

No more than 20 credits from one department; no more than 20 lower-division credits.

Required Courses (29–30 credits)

BOT 321. Plant Systematics (4)
 CSS/SOIL 466. Soil Morphology and Classification (4)
 FES/FW 445. Ecological Restoration (4)
 GEO 423. Land Use in the American West (3)
 CH 122. *General Chemistry (5)
 or CH 232. *General Chemistry (4) and CH 262. *Laboratory for Chemistry 232 (1)
 FOR/RNG 436. Wildland Fire Science and Management (4)
 or FOR/FW/RNG 446. Wildland Fire Ecology (3)
 FW 479. Wetlands and Riparian Ecology (3)
 or RNG 455. Riparian Ecology and Management (3)
 Z 345. *Introduction to Evolution (3)
 or CSS/PBG 430. Plant Genetics (3)

Social and Ethical Considerations Choose one course from below:

PHL 440. Environmental Ethics (3)
 PHL 443. *World Views and Environmental Values (3)
 SOC 480. *Environmental Sociology (4)
 SOC 481. *Society and Natural Resources (4)

Ecological and Natural Resource Electives**Choose a minimum of 8 credits:**

BOT/FES 415. Forest Insect and Disease Management (5)
 BOT 488. Environmental Physiology of Plants (3)
 CSS/CROP 440. Weed Management (4)
 CSS/SOIL 468. Soil Landscape Analysis (4)
 FOR 441. Silviculture Principles (4)
 FW 320. Introductory Population Dynamics (4)
 FW 321. Applied Community and Ecosystem Ecology (3)
 FW 426. Coastal Ecology and Resource Management (5)
 FW 451. Avian Conservation and Management (3)
 FW 453. Forest Management and Wildlife Conservation (3)
 FW 454. ^Fishery Biology (4)
 FW 456. Limnology (5)
 FW 458. Mammal Conservation and Management (4)
 FW 464. Marine Conservation Biology (3)
 FW 473. Fish Ecology (4)
 FW 481. Wildlife Ecology (4)
 RNG 421. Wildland Restoration and Ecology (4)
 Z 351. Marine Ecology (3)

Total=40–42**FISH AND WILDLIFE CONSERVATION OPTION**

This option prepares the student for a career in the broad arena of natural resource and wildlife conservation, with an emphasis on understanding of the relationship between animal species and their habitat requirements and the ability to apply this knowledge to the management of ecosystems as a means of conserving fish and wildlife.

No more than 20 credits from one department; no more than 20 lower-division credits.

- FOR 111. Introduction to Forestry (3)
or FES 342. Forest Types of the Northwest (3)
 FOR/FW/RNG 346. Topics in Wildland Fire (3)
or FOR/RNG 436. Wildland Fire Science and Management (4)
or FOR/FW/RNG 446. Wildland Fire Ecology (3)
 FW 323. Management Principles of Pacific Salmon in the Northwest (3)
or FW 470. *Ecology and History: Landscapes of the Columbia Basin (3)
or FW 360. *Origins of Fish and Wildlife Management-Evolution, Genetics, and Ecology (3)
 FES/FW 445. Ecological Restoration (4)
 FW 251. Principles of Fish and Wildlife Conservation (3)
 RNG 341. Rangeland Ecology and Management (3)
 RNG 455. Riparian Ecology and Management (3)

Fish and Wildlife Biology

Choose three of the following:

- FW 311. Ornithology (3)
 FW 315. Ichthyology (3)
 FW 317. Mammalogy (3)
 FW 320. Introductory Population Dynamics (4)
 FW 321. Applied Community and Ecosystem Ecology (3)

Habitat Management

Choose two of the following:

- FW 326. Integrated Watershed Management (3)
 FW 435. ^Wildlife in Agricultural Ecosystems (3)
 FW 479. Wetlands and Riparian Ecology (3)

Natural Resources Policy

Choose one of the following:

- PS 475. Environmental Politics and Policy (4)
 SOC 481. *Society and Natural Resources (4)

Total=41

Footnotes:

- * Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

FOREST ECOSYSTEMS OPTION

This option will assist students in understanding the nature of forest ecosystems and the processes by which they function. Course work includes an understanding of the multiple resources and values associated with forest ecosystems and some of the techniques involved in managing them.

Ecological Foundations (21 credits)

- BOT/FES 415. Forest Insect and Disease Management (5)
 FES 341. Forest Ecology (3)
 FOR/FW/RNG 346. Topics in Wildland Fire (3)
 FOR 441. Silviculture Principles (4)
 FW 251. Principles of Fish and Wildlife Conservation (3)

- FW 453. Forest Management and Wildlife Conservation (3)

Ecology Breadth Courses (Choose at least 9 credits)

- BOT 321. Plant Systematics (4)
 BOT 442. Plant Population Ecology (3)
 FOR/RNG 436. Wildland Fire Science and Management (4)
or FOR/FW/RNG 446. Wildland Fire Ecology (3)
 FES/FW 445. Ecological Restoration (4)
 FS/NR/RNG 477. *Agroforestry (3)
 FW 458. Mammal Conservation and Management (4)
 RNG 351. Range Ecology I-Grasslands (3)
 RNG 352. Range Ecology II-Shrublands (3)
 RNG 455. Riparian Ecology and Management (3)

Technical Electives

(Choose at least 10 credits)

- BOT 425. Flora of the Pacific Northwest (3)
 FE 208. Forest Surveying (4)
 FE 209. Forest Photogrammetry and Remote Sensing (4)
 FE 370. Harvesting Operations (4)
 FOR 321. Forest Mensuration (5)
 ST 352. Introduction to Statistical Methods (4)

Total=40

GEOSCIENCES AND NATURAL RESOURCE OPTION

This option provides the student with a basic grounding in geosciences and a more specialized knowledge of monitoring environmental changes related to natural resources management.

Courses within the College of Earth, Ocean, and Atmospheric Sciences: (minimum of 33 credits)

Techniques courses within the Geography program (12 credits):

- GEO 301. Map and Image Interpretation (4)
 GEO 360. Cartography (4)
 GEO 444. Remote Sensing (4)

Natural Resources courses within the Geography program (minimum of 6 credits):

- GEO 420. Geography of Resource Use (3)
And any one of the following courses:
 GEO 323. ^Climatology (4)
 GEO 324. Geography of Life: Species Distributions and Conservation (4)
 GEO 330. *^Geography of International Development and Globalization (3)
 GEO 423. Land Use in the American West (3)
 GEO 424. International Water Resources Management (3)
 GEO 425. Water Resources Management in the U.S. (3)

Courses within the Geology program (minimum of 15 credits)

- GEO 201. *Physical Geology (4)
 GEO 202. *Earth Systems Science (4)
 GEO 322. Surface Processes (4)

Choose any one of the following courses:

- GEO 310. Earth Materials I: Mineralogy (4)

- GEO 432. Applied Geomorphology (3)
 GEO 433. Coastal Geomorphology (3)
 GEO 486. Quaternary Paleoclimatology (3)
 GEO 487. Hydrogeology (4)

Courses from other programs (minimum 7 credits)

Any two of the following courses:

- ANTH 477. Ecological Anthropology (4)
 ANTH 481. *Natural Resources and Community Values (3)
 PS 475. Environmental Politics and Policy (4)
 PS 477. International Environmental Politics and Policy (4)

Total=40

HUMAN DIMENSIONS IN NATURAL RESOURCES OPTION

The student will develop an understanding of the interconnectedness of human behavior and natural resource issues. Includes skills and knowledge to better understand the cultural, social, and philosophical issues associated with natural resources.

No more than 20 credits from one department; no more than 20 lower-division credits.

Ethical Issues

Select 6 credits from the following:

- ANTH 110. *Introduction to Cultural Anthropology (3)
 BI/FES/TOX 435. *Genes and Chemicals in Agriculture: Value and Risk (3)
 PHL 201. *Introduction to Philosophy (4)
 PHL 205. *Ethics (4)
 PHL 439. Philosophy of Nature (3)
 PHL 440. Environmental Ethics (3)
 PHL 443. *World Views and Environmental Values (3)
 PHL 470. Philosophy of Science (3)

Management and Communication Issues

Select 13 credits from the following:

- ANS/FES/FW 485/SOC. *Consensus and Natural Resources (3)
 AREC 253. *Environmental Law, Policy, and Economics (4)
 AREC 351. *Natural Resource Economics and Policy (3)
 AREC 352. *Environmental Economics and Policy (3)
 FES 351. Recreation Behavior and Management (4)
 FES 352. Wilderness Management (3)
 FES 355. Management for Multiple Resource Values (3)
 FES 365. *Issues in Natural Resources Conservation (3)
 FOR/FW/RNG 446. Wildland Fire Ecology (3)
 FW 251. Principles of Fish and Wildlife Conservation (3)
 FW 326. Integrated Watershed Management (3)

Social Issues (21 credits)

Required background course

SOC 204. *Introduction to Sociology (3)

Select 18 credits from the following:

- ANTH 481. *Natural Resources and Community Values (3)
 AREC 432. Environmental Law (4)

FW 340. *Multicultural Perspectives in Natural Resources (3)
 FW 350. *Endangered Species, Society, and Sustainability (3)
 GEO 300. *Sustainability for the Common Good (3)
 HST 481. *Environmental History of the U.S. (4)
 PS 475. Environmental Politics and Policy (4)
 SOC 360. *Population Trends and Policy (4)
 SOC 454. *Leisure and Culture (4)
 SOC 456. *Science and Technology in Social Context (4)
 SOC 480. *Environmental Sociology (4)
 SOC 481. *Society and Natural Resources (4)
 WGSS 440. *Women and Natural Resources (3)
 WGSS 450. Ecofeminism (3)

Total=40

INDIVIDUALIZED SPECIALTY OPTION

Natural Resources Specialty Option (40 credits)

Incorporated in a student's course of study is the Specialty option – 40 credits supporting an academic theme related to natural resources. It is in the specialty option that the student develops depth and a particular focus on natural resources.

Individualized Specialty Options

If you are interested in creating your own specialty area, discuss this with your advisor as soon as possible. The advisor will be able to guide you in creating an option that works for you and satisfies the program requirements.

Student-designed specialty options must:

- contain at least 20 credits of upper-division courses
- consist of a minimum of 40 credits, encompassing at least three departments, with not more than 20 credits from one department
- have course work that reflects stated knowledge and skill "goals"
- not come close to "duplicating" existing majors

LAW ENFORCEMENT NATURAL RESOURCES OPTION

The student will develop skills and knowledge necessary to practice natural resource law enforcement.

No more than 20 credits from one department; no more than 20 lower-division credits.

COMM 440. Theories of Conflict and Conflict Management (3)
or FES 360. Collaboration and Conflict Management (3)
 FES 251. Recreation Resource Management (4)
 FW 251. Principles of Fish and Wildlife Conservation (3)
 FW 316. Systematics of Fishes (2)
 FW 318. Systematics of Mammals (2)

FW 341. Fish and Wildlife Law Enforcement (2)
 FW 453. Forest Management and Wildlife Conservation (3)
 FW 458. Mammal Conservation and Management (4)
 SOC 204. *Introduction to Sociology (3)

Choose four of the following classes:

SOC 340. Deviant Behavior and Social Control (4)
 SOC 440. Juvenile Delinquency (4)
 SOC 441. Criminology and Penology (4)
 SOC 442. Sociology of Drug Use and Abuse (4)
 SOC 448. Law and Society (3)

Recommended additional training (not required): Students may consider attending an approved law enforcement training program.

Total=41

NATIVE AMERICANS AND NATURAL RESOURCES OPTION

The student will develop an understanding of how native populations used and managed the natural resources of the Northwest in prehistoric (prior to the arrival of Europeans), historic, and contemporary time periods; how Native Americans view the usage of natural resources today; and to learn the various methods by which this information is developed.

No more than 20 credits from one department; no more than 20 lower-division credits.

Required Background Course

ANTH 330. *Evolution of People, Technology, and Society (3)

General Requirements (12 credits—6 in Prehistoric; 6 in Contemporary)

Prehistoric Use of Natural Resources in Native North America (6 credits):

ANTH 433. First Americans, Last Frontiers (3)
 ANTH 434. North America after the Ice Age (3)
 ANTH 436. Northwest Prehistory (3)
 FW 470. *Ecology and History: Landscapes of the Columbia Basin (3)
 HST 469. History of the Pacific Northwest (4)
 HST 481. *Environmental History of the U.S. (4)

Contemporary Uses of Natural Resources in Native North America (6 credits):

AG 301. *Ecosystem Science of Pacific NW Indians (3)
 ANTH 311. *Peoples of the World—North America (3)
 ANTH 472. Contemporary Indian Issues (4)
 ENG 360. *Native American Literature (4)
 ES 445. *Native American Science and Technology (3)
 ES/PHL 448. Native American Philosophies (3)

Methods (6 credits)

ANTH 490. Topics in Methodology (3)
 ANTH 497. Archeological Field Methods (3)
 ANTH 498. Oral Traditions (3)
 COMM 414. Communication Research Methods (3)
 FW 255. Field Sampling of Fish and Wildlife (3)

Disciplinary Perspectives in Native Americans and Natural Resource Issues (Choose 20 credits)

ANTH 435. Cultural Resources: Policy and Procedures (3)
 ANTH 477. Ecological Anthropology (4)
 ANTH 481. *Natural Resources and Community Values (3)
 ES 243. *Native American Experience in the 20th Century U.S. (3)
 ES 345. Native Americans in Oregon (3)
 ES 444. Native American Law: Tribes, Treaties, and the United States (3)
 FW 340. *Multicultural Perspectives in Natural Resources (3)
 GEO 300. *Sustainability for the Common Good (3)
 GEO 324. Geography of Life: Species Distributions and Conservation (4)
 GEO 420. Geography of Resource Use (3)

Total=41

NATURAL RESOURCE EDUCATION OPTION

This option will prepare students for careers as educators within the broad field of natural resources and to help them learn to bridge the gap in knowledge that exists between experts and others. The focus is on youth or community education that occurs outside of formal school settings. Those interested in becoming K-12 teachers should explore options offered by the College of Education, including their dual degree option.

No more than 20 credits from one department; no more than 20 lower-division credits.

Natural Resource Base (17 credits)

FES 251. Recreation Resource Management (4)
 FW 251. Principles of Fish and Wildlife Conservation (3)
 RNG 341. Rangeland Ecology and Management (3)

Plus 7 additional credits from AG, FE, FOR, FS, FW, GEO or another area of natural resources.

Education/Communication Processes (23 credits)

FES 493. Environmental Interpretation (4)
 SOC 450. Sociology of Education (4)
 TCE 216. *Purpose, Structure, and Function of Education in a Democracy (3)
 TCE 219. Civil Rights and Multicultural Issues in Education (3)
 TCE 253. Learning Across the Lifespan (3)
 WR 327. *Technical Writing (3)

Plus 3 upper-division credits in speech communication, education (see especially Teacher and Counselor Education), agriculture education, writing,

or an allied communication/education field; supervised internships can be used to meet this requirement, if approved in advance.

Additional courses required in Natural Resources Core and Breadth:

From the Vegetation ID area of the Natural Resources Core:

FES 141. Tree and Shrub Identification (3) or FES 241. Dendrology (5)

Note: Writing I, Writing II, and Speech are required by the baccalaureate core, and may not be used toward the “3 additional credits” requirement above. WR 327 must be taken in addition to Writing I, Writing II, and Speech.

Total=40

NATURAL RESOURCE POLICY AND MANAGEMENT OPTION

This option will prepare students for careers in the broad arena of natural resource and environmental conservation, with an emphasis on the social and political aspects of resource issues.

No more than 20 credits from one department; no more than 20 lower-division credits.

Social Science Foundation

Students must take at least two courses from the following. [PS and SOC are prerequisites for certain upper-division courses]

PHL 201. *Introduction to Philosophy (4)
PS 201. *Introduction to United States Government and Politics (4)
PSY 201. *General Psychology (3)
or PSY 202. *General Psychology (3)
SOC 204. *Introduction to Sociology (3)

Social Sciences and Natural Resources

Students must take at least three courses from the following, with no more than two from any one department:

AG 301. *Ecosystem Science of Pacific NW Indians (3)
AG 421. ^Leadership Development (3)
ANS/FES/FW 485/SOC. *Consensus and Natural Resources (3)
COMM 321. Introduction to Communication Theory (3)
FOR 111. Introduction to Forestry (3)
FW 251. Principles of Fish and Wildlife Conservation (3)
FW 323. Management Principles of Pacific Salmon in the Northwest (3)
FW 340. *Multicultural Perspectives in Natural Resources (3)
FW 470. *Ecology and History: Landscapes of the Columbia Basin (3)
GEO 300. *Sustainability for the Common Good (3)
SOC 360. *Population Trends and Policy (4)
SOC 454. *Leisure and Culture (4)
SOC 456. *Science and Technology in Social Context (4)
SOC 480. *Environmental Sociology (4)
SOC 481. *Society and Natural Resources (4)

Natural Resource Policy and Management

Students choose 25 credits from the list of courses below.

AREC 253. *Environmental Law, Policy, and Economics (4)
BOT 440. Field Methods in Plant Ecology (4)
ENSC 479. ^*Environmental Case Studies (3)
FES 342. Forest Types of the Northwest (3)
FOR/FW/RNG 346. Topics in Wildland Fire (3)
FES 365. *Issues in Natural Resources Conservation (3)
FES/FW 445. Ecological Restoration (4)
FOR/RNG 436. Wildland Fire Science and Management (4)
FOR/FW/RNG 446. Wildland Fire Ecology (3)
FW 303. Survey of Geographic Information Systems in Natural Resources (3)
FW 311. Ornithology (3)
FW 315. Ichthyology (3)
FW 317. Mammalogy (3)
FW 320. Introductory Population Dynamics (4)
FW 321. Applied Community and Ecosystem Ecology (3)
FW 325. *Global Crises in Resource Ecology (3)
FW 326. Integrated Watershed Management (3)
FW 350. *Endangered Species, Society, and Sustainability (3)
FW 427. Principles of Wildlife Diseases (4)
FW 435. ^Wildlife in Agricultural Ecosystems (3)
FW 479. Wetlands and Riparian Ecology (3)
GEO 301. Map and Image Interpretation (4)
GEO 308. *Global Change and Earth Sciences (3)
GEO 365. Introduction to Geographic Information Systems (4)
GEO 465. Geographic Information Systems and Science (4)
PS 449. ^Topics in Comparative Politics (4)
PS 475. Environmental Politics and Policy (4)
RNG 455. Riparian Ecology and Management (3)
RNG 490. Rangeland Management Planning (4)

Total=40

Footnotes

* Baccalaureate Core Course
^ Writing Intensive Course (WIC)

NATURAL RESOURCES CONSERVATION AND TECHNOLOGY OPTION

Students will develop the skills necessary to apply natural resources techniques and ecological concepts on the ground and to acquire the knowledge necessary to assist management within both the ecosystem and socio-political components of natural resource management.

Note: This option is designed for the OSU-Cascades Campus. Students utilize course work from the Cascades campus partner institution Central Oregon Community College. The option may be modified to provide appropriate transfer of courses from other community colleges

with forest technology degree programs.

No more than 20 credits from one department; no more than 20 lower-division credits.

Conservation Courses (3 courses, 9 credits)

FES 365. *Issues in Natural Resources Conservation (3)
FW 251. Wildlife Conservation (3)[COCC]
FW 325. *Global Crises in Resource Ecology (3)
FW 350. *Endangered Species, Society and Sustainability (3)

Technology Courses (3 courses, 9–10 credits)

BI 371. ^Ecological Methods (3)
FOR 220A. Aerial Photo (3)[COCC]
FOR 230A. Map, Compass, and GPS (3)[COCC]
FOR 230B. Forest Surveying (3)[COCC]

Sustainability (2 courses, 7 credits)

NR 350. *Sustainable Communities (4)
NR 499. Special Topics: Sustainable Community Practicum (3)

Ecology and Ecosystems

Choose 15+ credits from the following, no more than 2 courses in the same department:

CSS/SOIL 466. Soil Morphology and Classification (4)
FOR 240B. Wildlife Ecology (3)[COCC]
FES 342. Forest Types of the Northwest (3)
FES 444. Ecological Aspects of Park Management (3)
FES/FW 445. Ecological Restoration (4)
FW 311. Ornithology (3)
FW 317. Mammalogy (3)
FW 320. Introductory Population Dynamics (4)
FW 479. Wetlands and Riparian Ecology (3)
FW 481. Wildlife Ecology (4)
PS 475. Environmental Politics and Policy (4)
RNG 351. Range Ecology I–Grasslands (3)

Total=40

Footnotes:

* Baccalaureate Core Course
^ Writing Intensive Course (WIC)
[COCC] Course at Central Oregon Community College

RECREATION AND TOURISM MANAGEMENT OPTION

This option prepares students for careers managing people and natural resource areas to provide high quality recreation and tourism opportunities.

No more than 20 credits from one department; no more than 20 lower-division credits.

Recreation and Tourism Management Foundation (19–20 credits)

FES 251. Recreation Resource Management (4)
FES 351. Recreation Behavior and Management (4)
FES 356. Recreation Resource Planning (4)
FES 422. Research Methods in Social Science (4)

- FES 352. Wilderness Management (3)#
 or FES 453. Nature-Based Tourism (3)#
 or FES 493. Environmental Interpretation (4)#
 # Of these three courses, the two courses not taken for this option must be taken in the Natural Resources Breadth sections (e.g., Social Issues, Resource Values/Philosophy, Political Dimensions).

Technical/Field Skills (choose 10–11 credits)

- COMM 382. Telemedia Design and Production (4)
 CS 195. Introduction to Web Authoring (4)
 FE 208. Forest Surveying (4)
 FW 255. Field Sampling of Fish and Wildlife (3)
 FW 341. Fish and Wildlife Law Enforcement (2)
 GEO 301. Map and Image Interpretation (4)
 GEO 360. Cartography (4)
 GEO 445. Computer-Assisted Cartography (3)

Applications in Recreation and Social Science (choose 10–11 credits)

- ANTH 477. Ecological Anthropology (4)
 ANTH 480. Topics in Applied Anthropology (1–4)
 AREC 253. *Environmental Law, Policy, and Economics (4)
 COMM 324. Communication in Organizations (3)
 COMM 326. Intercultural Communication (3)
 PS 475. Environmental Politics and Policy (4)
 SOC 454. *Leisure and Culture (4)
 SOC 481. *Society and Natural Resources (4)

Total=40

Footnotes:

- * Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

RESOURCE CONSERVATION OPTION

This option will prepare students for careers in natural resources and conservation. It is offered on the Corvallis campus and is designed for transfer students from the Forest Technology program at Central Oregon Community College. The option may be modified to provide appropriate transfer of courses from other community colleges with forest technology academic programs.

No more than 20 credits from one department; no more than 20 lower-division credits.

Central Oregon Community College/Forest Resource Technology (20 credits)

- FOR 202. Forest Entomology/Pathology (3)
 FOR 205. Silviculture and Harvesting Processes (5)
 FOR 230A. Map, Compass and GPS (3)
 FOR 230B. Forest Surveying (3)
 FOR 240B. Wildlife Ecology (3)
 FOR 260. Conservation of Natural Resources (3)

OSU/Natural Resources (Choose 20 credits)

- CSS/SOIL 466. Soil Morphology and Classification (4)
 FE 370. Harvesting Operations (4)
 FOR/RNG 436. Wildland Fire Science and Management (4)
 FOR 441. Silviculture Principles (4)
 FES/FW 445. Ecological Restoration (4)
 FOR/FW/RNG 446. Wildland Fire Ecology (3)
 FOR/FE 456. *International Forestry (3)
 FS 432. Planning Agroforestry Projects (2)
 FS 439. ^Human Dimensions of Fisheries and Wildlife Management (3)
 or FW 439. ^Human Dimensions of Fisheries and Wildlife Management (3)
 FS/NR/RNG 477. *Agroforestry (3)
 FW 341. Fish and Wildlife Law Enforcement (2)
 FW 453. Forest Management and Wildlife Conservation (3)

Total=40

Footnotes

- * Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)
 COCC course catalog online: http://current.cocc.edu/Degrees_Classes/Catalog/default.aspx

SOIL RESOURCES OPTION

The student will develop an understanding of soil ecosystems and become skilled at their inventory and management.

No more than 20 credits from one department; no more than 20 lower-division credits.

Soil System Science (12 credits)

- CSS 306. Problem Solving: Soil Science Applications (1) [*CSS taught at EOU La Grande campus only.*]
 CSS 375. Soil Resource Potentials (3)
 CSS/SOIL 455. Biology of Soil Ecosystems (4)
 CSS/SOIL 466. Soil Morphology and Classification (4)

Agroecosystems (choose 8 credits)

- BEE 433. Irrigation System Design (4)
 BEE 439. Irrigation Principles and Practices (4)
 HORT 300. Crop Production in Pacific Northwest Agroecosystems (4)
 RNG 341. Rangeland Ecology and Management (3)
 RNG 351. Range Ecology I-Grasslands (3)
 RNG 352. Range Ecology II-Shrublands (3)

Soil Resource Studies (20 credits) Soil Landscapes (8 credits)

- CSS/SOIL 468. Soil Landscape Analysis (4)
 GEO 322. Surface Processes (4)

Geomatics and Landscape Analysis (12 credits)

- FE 209. Forest Photogrammetry and Remote Sensing (4)
 GEO 301. Map and Image Interpretation (4)
 RNG 441. Rangeland Analysis (4)

Additional courses required in the Natural Resources Core and Breadth

- CSS 305. Principles of Soil Science (4)

[*Taught at EOU La Grande campus only.*]
 or SOIL 205. *Soil Science (4)

Total=40

SUSTAINABLE AGROFORESTRY OPTION

The student pursuing this option will develop skills and knowledge necessary to design and manage integrated sustainable land management systems involving co-production of woody plants and agricultural plants and animals.

No more than 20 credits from one department; no more than 20 lower-division credits.

Required Courses

- BOT 488. Environmental Physiology of Plants (3)
 CH 122. *General Chemistry (5)
 or CH 232. General Chemistry (4) **and**
 CH 262. *Laboratory for Chemistry 232 (1)
 CSS/CROP/HORT 300. Crop Production in Pacific Northwest Agroecosystems (4)
 CSS 306. Problem Solving: Soil Science Applications (1) [*CSS taught at EOU La Grande campus only.*]
 CSS 315. ^Nutrient Management and Cycling (4)
 or HORT 316. Plant Nutrition (4)
 CSS/CROP 440. Weed Management (4)
 or FES/FW 445. Ecological Restoration (4)
 FOR 441. Silviculture Principles (4)
 or HORT 301. The Biology of Horticulture (3)
 FS 432. Planning Agroforestry Projects (2)
 FS/NR/RNG 477. *Agroforestry (3)
 HORT 311. Plant Propagation (4)
 RNG 442. Rangeland-Animal Relations (4)
Choose one of the following courses:
 ANS 215. Beef/Dairy Industries (3)
 ANS 216. Sheep/Swine Industries (3)
 CSS/CROP 310. Forage Production (4)
 HORT 451. Tree Fruit Physiology and Culture (4)
 HORT 452. Berry and Grape Physiology and Culture (4)

Additional Courses Required in Natural Resources Core and Breadth:

- CSS 305. Principles of Soil Science (4)
 [*Taught at EOU La Grande campus only.*]
 or SOIL 205. *Soil Science (4)
 RNG 441. Rangeland Analysis (4)

Total=40–41

URBAN FOREST LANDSCAPES OPTION

Available via Ecampus.

This option will help students understand the complexities surrounding the culture and management of urban forest ecosystems. It includes an examination of the economic, social, and environmental benefits and values of trees in urban areas, and the relationship between people and trees.

No more than 20 credits from one department; no more than 20 lower-division credits.

**Urban Forest Foundations
(21–22 credits)**

FES/HORT 350. Urban Forestry (3)
 FES/HORT 447. Arboriculture (4)
 FES/FW 445. Ecological Restoration (4)
 FES/HORT 455. Urban Forest Planning,
 Policy and Management (4)
 HORT 226. Landscape Plant Materials I:
 Deciduous Hardwoods and Conifers (4)
 HORT 318. ^Applied Ecology of Managed
 Ecosystems (3)
or HORT 316. Plant Nutrition (4)

**Social/Political/Community
Integration (20–21 credits)**

ANS/FES/FW/SOC 485. *Consensus and
 Natural Resources (3)
 ANTH 481. *Natural Resources and
 Community Values (3)
 FS 492. Ecosystem Services Ecology,
 Sociology, Policy (3)
 SOC 481. *Society and Natural Resources (4)
 FOR 462. Natural Resource Policy and Law (3)
or PS 475. Environmental Politics and
 Policy (4)
 GEO 423. Land Use in the American West (3)
or FW 435. ^Wildlife in Agricultural
 Ecosystems (3)

Total=41–43**Footnotes:**

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

**WATERSHED
MANAGEMENT OPTION**

Students will obtain skills and knowl-
 edge about natural water systems and
 water quality, specifically management
 of surface water in forest and rangeland
 ecosystems.

No more than 20 credits from one
 department; no more than 20 lower-
 division credits.

CH 122. *General Chemistry (5)
or CH 232. *General Chemistry (4) **and**
 CH 262. *Laboratory for Chemistry 232 (1)
 CSS/SOIL 466. Soil Morphology and
 Classification (4)
 FE 208. Forest Surveying (4)
 FW 315. Ichthyology (3)
and FW 316. Systematics of Fishes (2)
or just GEO 487. Hydrogeology (4)
 FW 456. Limnology (5)
 MTH 251. *Differential Calculus (4)
 MTH 252. Integral Calculus (4)
 PH 201, PH 202. *General Physics (5,5)
 RNG 455. Riparian Ecology and
 Management (3)
or FW 479. Wetlands and Riparian
 Ecology (3)

**Additional Courses Required
in Natural Resources Core and
Breadth:**

CSS 305. Principles of Soil Science (4)
 [Taught at EOU La Grande campus only.]
 or SOIL 205. *Soil Science (4)
 FE 430. Watershed Processes (4)
 GEO 102. *The Surface of the Earth (4)
 RNG 355. Desert Watershed Management
 (3)

Total=43–44**WILDLAND FIRE
ECOLOGICAL OPTION**

This option will help students under-
 stand the nature of fire in wildland
 ecosystems. It includes an understanding
 of the dynamics of fire behavior and post
 fire response.

No more than 20 credits from one
 department; no more than 20 lower-
 division credits.

**Foundations in Wildland Fire and
Recovery (21 Credits)**

FES 454. Managing at the Wildland-Urban
 Interface (3)
 FES/FW 445. Ecological Restoration (4)
or RNG 421. Wildland Restoration and
 Ecology (4)
 FOR/FW/RNG 346. Topics in Wildland Fire
 (3)
 FOR/RNG 436. Wildland Fire Science and
 Management (4)
 FOR 441. Silviculture Principles (4)
 FOR/FW/RNG 446. Wildland Fire Ecology (3)

**Ecological and Natural Resource
Electives (Choose 19 credits)**

BOT/FES 415. Forest Insect and Disease
 Management (5)
 BOT 442. Plant Population Ecology (3)
 CSS/CROP 440. Weed Management (4)
 CSS/SOIL 466. Soil Morphology and
 Classification (4)
 CSS/SOIL 468. Soil Landscape Analysis (4)
 FES 342. Forest Types of the Northwest (3)
 FW 453. Forest Management and Wildlife
 Conservation (3)
 FW 458. Mammal Conservation and
 Management (4)

**Additional Courses Required
in Natural Resources Core and
Breadth**

CSS 305. Principles of Soil Science (4)
 [Taught at EOU La Grande campus only.]
 or SOIL 205. *Soil Science (4)

Total=40**Footnotes:**

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

**RECREATION RESOURCE
MANAGEMENT (BS, CRED, HBS)**

The BS in Recreation Resource Manage-
 ment prepares students to meet the chal-
 lenges of providing quality recreation
 opportunities while maintaining the eco-
 logical integrity of natural resources. The
 curriculum produces students proficient
 in recreation behavior, recreation plan-
 ning and management, environmental
 interpretation, wilderness management,
 resource economics, communication,
 and resource analysis and policy. The
 Society of American Foresters-accredited
 curriculum provides a solid mix of physi-
 cal and social sciences, resource man-
 agement (including wildlife, range, and
 forestry), and quantitative methods.

Completion of an approved option or
 minor is **required** for the Recreation
 Resource Management degree. Declara-
 tion of the option or minor should be

done by the end of the sophomore year.
 Courses for an option or minor are in
 addition to the core curriculum. Some
 courses may require prerequisites not
 included in the core curriculum. Choice
 of option or minor must be approved by
 an academic advisor.

Currently approved minors include
 Business and Entrepreneurship, Fisher-
 ies and Wildlife, Forest Management
 (27 credits required), Natural Resources,
 Philosophy, Rangeland Ecology and Man-
 agement, and Resource Economics.

Courses required for an option may
 not count toward a minor. Students may
 not take an option and a minor from the
 same field of study.

The following **nine** options are only
 available to students majoring in Recre-
 ation Resource Management:

- Cultural Resource Management
- Environmental Resource
 Interpretation
- Forest Resources
- Law Enforcement
- Park Landscapes
- Public Policy
- Resource Planning
- Sociology
- Tourism

Students may work with an academic
 advisor to develop their own individual-
 ized option.

All students pursuing the BS in Recre-
 ation Resource Management degree must
 earn grades of C– or better in all required
 forestry courses (with FE, FOR, FS, WSE
 course designators) or approved substitu-
 tions for majors, minors and options.

First Year (44)

COMM 111. *Public Speaking (3)
 or COMM 114. *Argument and Critical
 Discourse (3)
 ECON 201. *Introduction to
 Microeconomics (4)
 FOR 111. Introduction to Forestry (3)
 or NR 201. Managing Natural Resources
 for the Future (3)
 FOR 112. Introduction to Computer
 Applications in Forestry (3)
 FES 251. Recreation Resource Management (4)
 HHS 231. *Lifetime Fitness for Health (2)
 and HHS 241–HHS 248. *Lifetime Fitness:
 (various activities) (1)
 or any PAC course (1–2)
 MTH 245. *Mathematics for Management,
 Life, and Social Sciences (4)
 *Writing I, II (3,3)
 *Perspectives (6)
 Electives/option/minor (8)

Sophomore Year (45–47)

FE 257. GIS and Forest Engineering
 Applications (3)
 or GEO 365. Introduction to Geographic
 Information Systems (4)
 FES 207. Career Development (1)
 FES. *Forest Biology (4)
 FES 241. Dendrology (5)
 ST 351. Introduction to Statistical Methods
 (4)

*Perspectives (14)

*Science, Technology and Society (3)
Electives/option/minor (8)

**Natural Resource Systems Block
(Choose one course for 3-4)**

ANTH 480. Topics in Applied Anthropology: "Non-Timber Forest Products Culture and Management" (4)

CSS/SOIL 205. *Soils: Sustainable Ecosystems (4)

ES 399. Special Topics: Native American Resource Management ONLY (3)

FE 430. Watershed Processes (4)

FOR 441. Silviculture Principles (4)

FOR/RNG 436. Wildland Fire Science and Management (4)

FOR/FW/RNG 446. Wildland Fire Ecology (3)

FW 251. Principles of Fish and Wildlife Conservation (3)

FW 453. Forest Management and Wildlife Conservation (3)

FW 479. Wetlands and Riparian Ecology (3)

GEO 307. *National Park Geology and Preservation (3)

GEO 420. Geography of Resource Use (3)

RNG 341. Rangeland Ecology and Management (3)

RNG 355. Desert Watershed Management (3)

RNG 421. Wildland Restoration and Ecology (4)

RNG 455. Riparian Ecology and Management (3)

Junior Year (44-46)

FOR 330. Forest Conservation Economics (4) or AREC 351. *Natural Resource Economics and Policy (3)

FES 351. Recreation Behavior and Management (4)

FES 352. Wilderness Management (3)

FES 356. Recreation Resource Planning (4)

FES 422. Research Methods in Social Science (4)

FES 444. Ecological Aspects of Park Management (3)

FOR 441. Silviculture Principles (4) or FW 453. Forest Management and Wildlife Conservation (3)

Electives/option/minor (13)

**Technical/Field Skills Block
(Choose one course for 2-4)**

ANTH 430. Topics in Archaeology (*topics must be pre-approved*) (1-4)

ANTH 497. Archaeological Field Methods (3)

COMM 280. Media Communication in the Information Age (3)

CS 195. Introduction to Web Authoring (4)

FE 208. Forest Surveying (4)

FE 257. GIS and Forest Engineering Applications (3)

FES/FW 445. Ecological Restoration (4)

FW 255. Field Sampling of Fish and Wildlife (3)

FW 426. Coastal Ecology and Resource Management (*HMSC campus*) (5)

GEO 301. Map and Image Interpretation (4)

GEO 352. *Oregon: Geology, Place, and Life on the Ring of Fire (4)

GEO 360. Cartography (4)

GEO 444. Remote Sensing (4)

GEO 465. Geographic Information Systems and Science (4)

Senior Year (49)

FES 432. Economics of Recreation Resources (4)

FES 453. Nature-Based Tourism (3)

FES 493. Environmental Interpretation (4)

FOR 459. Forest Resource Planning and Decision Making (4)

FOR 460. ^Forest Policy (4)

Electives/option/minor (15)

Students are required to complete 6 months of work experience.

- 3 credits from the Communications and Negotiations Block listed below.
- 3-4 credits from the Research/Analytical Techniques Block listed below.
- 6-8 credits from the Social Science and Policy Block listed below.

Communications and Negotiations Block (Choose one course for 3 credits)

COMM 316. Advanced Persuasion (3)

COMM 322. Small-Group Problem Solving (3)

COMM 324. Communication in Organizations (3)

COMM 326. Intercultural Communication (3)

COMM 328. Nonverbal Communication (3)

COMM 432. Gender and Communication (3)

COMM 440. Theories of Conflict and Conflict Management (3)

COMM 442. Bargaining and Negotiation Processes (3)

Research/Analytical Techniques Block (Choose one course for 3-4 credits)

ANTH 422. Historic Materials Analysis (3)

ANTH 430. Topics in Archaeology (1-4)

ANTH 490. Topics in Methodology (1-4)

ANTH 492. Archaeological Laboratory Methods (1-3)

COMM 414. Communication Research Methods (3)

ES 453. Ethnohistory Methodology (3)

FES/FW 445. Ecological Restoration (4)

FOR 330. Forest Conservation Economics (4)

FOR 457. Techniques for Forest Resource Analysis (4)

FW 426. Coastal Ecology and Resource Management (*HMSC campus*) (5)

GEO 350. *Population Geography (3)

GEO 444. Remote Sensing (4)

GEO 465. Geographic Information Systems and Science (4)

H 490. *Systems Thinking and Practice (4)

HSTS 419. **Studies in Scientific Controversy: Methods and Practices (4)

SOC 418. Quantitative Research Methods (4)

ST 411. Methods of Data Analysis (4)

Social Science and Policy Block (Choose two courses for 6-8 credits)

AG 301. *Ecosystem Science of Pacific NW Indians (3)

ANTH 435. Cultural Resources: Policy and Procedures (3)

ANTH 477. Ecological Anthropology (4)

ANTH 478. Anthropology of Tourism (4)

ANTH 481. *Natural Resources and Community Values (3)

AREC 253. *Environmental Law, Policy, and Economics (4)

AREC 432. Environmental Law (4)

ES 444. Native American Law: Tribes, Treaties, and the US (3)

FOR 462. Natural Resource Policy and Law (3)

FW 340. *Multicultural Perspectives in Natural Resources (3)

FW 350. *Endangered Species, Society and Sustainability (3)

FW 421. Aquatic Biological Invasions (*HMSC campus*) (4)

GEO 335. *Introduction to Water Science and Policy (3)

PS 475. Environmental Politics and Policy (*Distance Ed only*) (4)

PS 477. International Environmental Politics and Policy (4)

RNG 477. *Agroforestry (3)

SOC 454. *Leisure and Culture (4)

SOC 475. Rural Sociology (4)

SOC 480. *Environmental Sociology (4)

SOC 481. *Society and Natural Resources (4)

SOC 485. *Consensus and Natural Resources (*Distance Ed only*) (3)

WGSS 450. Ecofeminism (3)

Natural Resource Systems block (Choose one course for 3 or 4 credits)

ANTH 480. Topics in Applied Anthropology: "Non-Timber Forest Products Culture and Management" (4)

CSS/SOIL 205. *Soil Science (4)

ES 399. Special Topics: Native American Resource Management (3)

FE 430. Watershed Processes (4)

FOR 441. Silviculture Principles (FOR 240 and FOR 141 or FOR 241) (4)

FOR/RNG 436. Wildland Fire Science and Management (4)

FOR/FW/RNG 446. Wildland Fire Ecology (3)

FW 251. Principles of Fish and Wildlife Conservation (3)

FW 453. Forest Management and Wildlife Conservation (FOR 240 or FOR 341) (3)

FW 479. Wetlands and Riparian Ecology (3)

GEO 307. *National Park Geology and Preservation (3)

GEO 420. Geography of Resource Use (3)

RNG 341. Rangeland Ecology and Management (3)

RNG 355. Desert Watershed Management (3)

RNG 421. Wildland Restoration and Ecology (4)

RNG 455. Riparian Ecology and Management (3)

Technical/Field Skills block (Choose one course for 3-5 credits)

ANTH 430. Topics in Archaeology (*topics must be pre-approved*) (1-4)

ANTH 497. Archaeological Field Methods (3)

COMM 280. Media Communication in the Information Age (3)

CS 195. Introduction to Web Authoring (4)

FE 208. Forest Surveying (4)

FE 257. GIS and Forest Engineering Applications (3)

FES/FW 445. Ecological Restoration (4)

FW 255. Field Sampling of Fish and Wildlife (3)

FW 426. Coastal Ecology and Resource Management (*HMSC campus*) (5)

GEO 301. Map and Image Interpretation (4)

GEO 360. Cartography (4)
 GEO 352. *Oregon: Geology, Place, and Life on the Ring of Fire (4)
 GEO 444. Remote Sensing (4)
 GEO 465. Geographic Information Systems and Science (4)

Footnotes:

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

OPTIONS**CULTURAL RESOURCE MANAGEMENT OPTION**

ANTH 110. *Introduction to Cultural Anthropology (3)
 ANTH 330. *Evolution of People, Technology, and Society (3)
 ANTH 435. Cultural Resources: Policy and Procedures (3)

Plus two courses from each of the following groups:

Anthropology

ANTH 230. Time Travelers (3)
 ANTH 380. *Cultures in Conflict (3)
 ANTH 432. *The Archaeology of Domestication and Urbanization (3)
 ANTH 433. First Americans, Last Frontiers (3)
 ANTH 436. Northwest Prehistory (3)
 ANTH 472. Contemporary Indian Issues (4)
 ANTH 481. *Natural Resources and Community Values (3)
 ES 243. *Native American Experience in the 20th Century U.S. (3)
 ES 323. Contemporary African American Social Discourse (3)
 ES 351. *Ethnic Minorities in Oregon (3)
 ES 399. Special Topics/Native American Resource Management [ONLY] (3)

History

HST 467, HST 468. History of the American West (4,4)
 HST 469. History of the Pacific Northwest (4)
 HST 481. *Environmental History of the U.S. (4)
 HSTS 418. *Science and Society (4)
 HSTS 421. *Technology and Change (4)

Total=23–24

Students who have taken one or more of these courses for their major may not also count those courses toward their Cultural Resource Management option (i.e., no double counting).

ENVIRONMENTAL RESOURCE INTERPRETATION OPTION

TCE 253. Learning Across the Lifespan (3)

Plus 14 credits from the following:

ANTH 110. *Introduction to Cultural Anthropology (3)
 ANTH 230. Time Travelers (3)
 ANTH 330. *Evolution of People, Technology, and Society (3)
 ANTH 430. Topics in Archaeology (1–4) (*Topics must be pre-approved*)
 ANTH 433. First Americans, Last Frontiers (3)
 ANTH 435. Cultural Resources: Policy and Procedures (3)
 ANTH 452. Folklore and Expressive Culture (4)

BI 301. *Human Impacts on Ecosystems (3)
 ES/PHL 448. Native American Philosophies (3)
 FW 302. Biology and Conservation of Marine Mammals (*Taught at HMSC*) (3)
 GEO 102. *The Surface of the Earth (4)
 GEO 307. *National Park Geology and Preservation (3)
 HST/HSTS. Upper-Division Course (3–4)
 HST/HSTS. Upper-Division Course (3–4)
 Z 345. *Introduction to Evolution (3)
 Z 348. *Human Ecology (3)
 Z 349. *Biodiversity: Causes, Consequences and Conservation (3)
 Z 351. Marine Ecology (3)

Total=21

Students who have taken one or more of these courses for their major may not also count those courses toward their Environmental Resource Interpretation option (i.e., no double counting).

Forest Resources Option

FOR 321. Forest Mensuration (5)
 FOR 331. Forest Resource Economics II (4)
 FOR 441. Silviculture Principles (4)
Select 8 credits from the following:
 FE 370. Harvesting Operations (4)
 FE 430. Watershed Processes (4)
 FOR/RNG 436. Wildland Fire Science and Management (4)
 FOR/FW/RNG 446. Wildland Fire Ecology (3)
 FOR 443. Silvicultural Practices (5)
 FOR 456. *International Forestry (3)
 FOR 462. Natural Resource Policy and Law (3)

Total=21

Students who have taken one or more of these courses for their major may not also count those courses toward their Forest Resources option (i.e., no double counting).

INDIVIDUALIZED SPECIALTY OPTION

Students may work with an academic advisor to develop their own individualized option.

LAW ENFORCEMENT OPTION

COMM 440. Theories of Conflict and Conflict Management (3)
 FW 341. Fish and Wildlife Law Enforcement (2)
 PHL 205. *Ethics (4)
 SOC 340. Deviant Behavior and Social Control (4)
 SOC 441. Criminology and Penology (4)
Plus 1 to 2 courses from the following:
 FW 415. Fisheries and Wildlife Law and Policy (3)
 SOC 421. Social Change and Modernization (3)
 SOC 424. Social Psychology (4)
 SOC 426. *Social Inequality (4)
 SOC 437. Race and Ethnic Relations (4)
 SOC 440. Juvenile Delinquency (4)
 SOC 448. Law and Society (3)

Recommended Additional Requirements:

Completion of a departmentally approved, off-campus law enforcement training program such as the Santa Rosa, California, Training Center (NPS oriented) or Skagit Valley College in Washington (state park oriented) is recommended.

Total=21–24**PARK LANDSCAPES OPTION**

HORT 226. Landscape Plant Materials (3)
 HORT 301. The Biology of Horticulture (3)
 HORT 315. Principles and Practices of Landscape Maintenance (4)
 HORT 318. ^Applied Ecology of Managed Ecosystems (3)
 HORT 358. ^Landscape Construction Techniques (4)

Total=21

Students who have taken one or more of these courses for their major may not also count those courses toward their Park Landscapes option (i.e., no double counting).

Footnotes:

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

PUBLIC POLICY OPTION

PS 201. *Introduction to U.S. Government and Politics (4)
Plus 5 courses from the following:
 ECON 435. The Public Economy (4)
 PS 371. Public Policy Problems (4)
 PS 414. Interest Groups (4)
 PS 415. Politics and the Media (4)
 PS 416. Public Opinion and Politics (4)
 PS 475. Environmental Politics and Policy (4)
 PS 476. *Science and Politics (4)
 PS 477. International Environmental Politics and Policy (4)
 PS 479. Topics in Public Policy and Public Administration (4)

Total=24

Students who have taken one or more of these courses for their major may not also count those courses toward their Public Policy option (i.e., no double counting).

RESOURCE PLANNING OPTION

GEO 301. Map and Image Interpretation (4)
 GEO 420. Geography of Resource Use (3)
 GEO 423. Land Use in the American West (3)
Select two of the following courses:
 AREC/ECON 352. *Environmental Economics and Policy (3)
 FOR 421. Spatial Analysis of Forested Landscapes (3)
 GEO 360. Cartography (4)
 GEO 451. Environmental Site Planning (3)
 GEO 452. Principles and Practices of Rural and Resource Planning (3)
 GEO 465. Geographic Information Systems and Science (3)
Select two additional courses from the Social Science and Policy block from

the Recreation Resource Management major OR two upper-division GEO courses (GEO courses must be pre-approved by the FOR academic advisor).

Total=22-25

Students who have taken one or more of these courses for their major may not also count those courses toward their Resource Planning option (i.e., no double counting).

SOCIOLOGY OPTION

SOC 204. *Introduction to Sociology (3)
SOC 360. *Population Trends and Policy (4)
SOC 480. *Environmental Sociology (4)
SOC 481. *Society and Natural Resources (4)
Plus two more upper-division SOC courses (8)

Total=23

Footnote:

* Baccalaureate Core Course

TOURISM OPTION

ANTH 478. Anthropology of Tourism (4)
BA 260. Introduction to Entrepreneurship (4)
BA 390. Marketing (4)
MRKT 492. Consumer Behavior (4)

Plus two courses from the following:

BA 463. Family Business Management (4)
BA/MRKT 498. Services Marketing (4)
TOL 371. Eco and Adventure Tourism (3)
(Offered at OSU-Cascades Campus)
TOL 475. Hospitality and Tourism Marketing (3) (Offered at OSU-Cascades Campus)
GEO 423. Land Use in the American West (3)
GEO 426. Third-World Resource Development (3)
GEO 451. Environmental Site Planning (3)
GEO 452. Principles and Practices of Rural and Resource Planning (3)
PS 475. Environmental Politics and Policy (4)

Students who have taken one or more of these courses for their major may not also count those courses toward their Tourism option (i.e., no double counting).

Total=22-24

TOURISM AND OUTDOOR LEADERSHIP (BS, CRED)

The Bachelor of Science in Tourism and Outdoor Leadership (TOL) is an interdisciplinary degree that gives students the conceptual and applied skills needed to provide high-quality visitor experiences while sustaining the natural resources where recreation and tourism occurs.

Completion of an approved option is required for the BS in TOL degree. Four options are currently available:

1. Adventure Leadership and Education
2. Eco and Adventure Tourism focuses on developing and managing businesses in eco and adventure tourism.
3. International Ecotourism focuses on

the special aspects of nature-based tourism in foreign countries.

4. Recreation Management focuses on the management of visitors by land management agencies.

Lower-division courses are from Central Oregon Community College (COCC) or equivalents from other institutions. Upper-division courses are from OSU-Cascades.

For information, contact OSU-Cascades, 541-322-3100, or visit the Tourism and Outdoor Leadership program in the OSU-Cascades website.

Baccalaureate Core

Biological Science (4)
Cultural Diversity (3)
DPD (4)
Fitness (3)
Literature and Art (3)
Mathematics (4)
Physical/Biological Science (4)
Physical Science (4)
Science, Technology and Society (3)
Social Processes (3)
Western Culture (3)
WR I (3)
WR II (3)
Speech (3)

Skills Requirements

HHP 280. Co-op Work Experience-Health and Human Performance (Practicum) (2) (COCC)

OL 255. Outdoor Living Skills (3) (COCC)

Choose one of the following COCC courses:

GEOG 265. Geographic Information Systems (4)
OL 294CC. Challenge Course Practices (3)
OL 294RC. Teaching Rock Climbing (3)
OL 294WG. Whitewater Raft Guiding (3)
HTRM 233. Event Planning (3)

or both:

OL 194MA. Mountaineering I (2)
OL 194MB. Mountaineering II (2)

TOL Core

BA 101. Introduction to Business (4) (COCC)
FES 444. Ecological Aspects of Park Management (3)
FOR 255. Resource Interpretation (3) (COCC)
FOR 371. Eco and Adventure Tourism (3)
FOR 375. ^Experiential Education (4)
FOR 378. Tourism and Recreation Data Analysis (3)
FOR 422. Research Methods in Social Science (4)
FOR 474. Entrepreneurship in Tourism and Outdoor Leadership (3)
FOR 476. Risk Management in Tourism and Outdoor Leadership (3)
FOR 410. Internship (8)
FOR 478. Legal Issues in Tourism and Outdoor Leadership (3)
FOR 479. *Nature and the Human Experience (3)
NR 350. *Sustainable Communities (4)
OL 111. Introduction to Outdoor Leadership (3) (COCC)
OL 207. Seminar in Outdoor Leadership (2) (COCC)

OL 244. Psychology of Risk and Adventure (3) (COCC)

OL 253. Wilderness Advanced First Aid (3) (COCC)

OL 271. Facilitating Group Experiences (3) (COCC)

OL 273. Outdoor Recreation Leadership (3) (COCC)

SP 111. *Fundamentals of Public Speaking (3) (COCC)

WR 122. *English Composition (4) (COCC)

Option (29)

Electives (28)

Total for Degree=180

Courses are offered at OSU-Cascades unless otherwise noted.

COCC Course Catalog: <http://www.cocc.edu/admissions/catalog/>

All students pursuing the BS in Tourism and Outdoor Leadership must earn grades of C- or better in all required forestry courses (with FE, FES, FOR, FS, WSE course designators) or approved substitutions for majors, minors and options.

OPTIONS

ADVENTURE LEADERSHIP AND EDUCATION OPTION

The Adventure Leadership and Education option focuses on developing effective teachers and leaders who will have the ability to competently manage a wide range of outdoor experiences.

Graduates of this option will be well suited for careers in outdoor leadership, adventure education, camp management, eco or adventure tour leadership, and other settings that require strong technical, teaching, and management skills.

Lower-division courses are from Central Oregon Community College (COCC) or equivalents from other institutions. Upper-division courses are from OSU-Cascades.

For information, contact OSU-Cascades, 541-322-3100 or visit the Tourism and Outdoor Leadership and program in the OSU-Cascades website.

FOR 372. Ethics in Adventure Leadership (3)

FOR 373. Wilderness and Adventure Education (4)

FOR 377. Expeditions I (4)

FOR 379. Expeditions II-Land (10)

FOR 380. Expeditions III-Water (3)

TCE 411. Educational Psychology, Learning, and Development (3)

One additional TOL skills course (3) (COCC)

Total=30 credits

All College of Forestry credits must be completed with a grade of C- or higher.

ECO AND ADVENTURE TOURISM OPTION

The Eco and Adventure Tourism option focuses on developing and managing businesses in eco and adventure tourism.

Graduates of this option will be well-suited for management positions in exist-

ing companies or for starting their own eco and adventure tourism business.

Lower-division courses are from Central Oregon Community College (COCC) or equivalents from other institutions. Upper-division courses are from OSU-Cascades.

For more information, contact OSU-Cascades, 541-322-3100 or visit the Tourism and Outdoor Leadership program in the OSU-Cascades website.

BA 217. Accounting Fundamentals (3) (COCC)

BA 224. Human Resources Management (4) (COCC)

BA 390. Marketing (4) (OSU)

EC 201. *Microeconomics (4) (COCC)

Plus additional approved courses (14 credits of upper-division courses)

Total=29

Courses are from OSU-Cascades unless otherwise noted.

All College of Forestry credits must be completed with a grade of C– or higher.

INTERNATIONAL ECOTOURISM OPTION

The International Ecotourism option focuses on the special aspects of nature-based tourism in foreign countries.

Students will:

- Develop language skills
- Use their internship for an international experience
- Develop business skills
- Within the TOL major, attain fundamental knowledge of protected-area management

Students who choose this option will be well suited for careers as international tour guides and managers, protected-area tourism managers, and tourism policy analysts.

Lower-division courses are from Central Oregon Community College (COCC) or equivalents from other institutions. Upper-division courses are from OSU-Cascades.

For information, contact OSU-Cascades, 541-322-3100 or visit of the Tourism and Outdoor Leadership program in the OSU-Cascades website.

BA 217. Accounting Fundamentals (COCC) (3)

BA 224. Human Resource Management (COCC) (4)

BA 390. Marketing (4) (OSU)

EC 201. Microeconomics (COCC) (4)

Upper-division foreign language (9)

Additional approved upper-division courses (5)

Total=29

RECREATION MANAGEMENT OPTION

The Recreation Management option will allow TOL students to specialize in content relevant to the management of visitors by land management agencies.

Lower-division courses are from Central Oregon Community College (COCC) or equivalents from other institutions. Upper-division courses are from OSU-Cascades.

For information, contact OSU-Cascades, 541-322-3100 or visit the Tourism and Outdoor Leadership and program in the OSU-Cascades website.

FES 352. Wilderness Management (3)

FES 356. Recreation Resource Planning (4)

FES 493. Environmental Interpretation (4)

FOR 240A. Forest Ecology (3)(COCC)

FOR 241A. Field Dendrology (3)(COCC)

FOR 251. Recreation Resource Management (4)(COCC)

Plus 2 courses selected from the following:
COMM 326. Intercultural Communication (3)

PS 475. Environmental Politics and Policy (4)

Or any upper-division course(s) with one of the following designators: AREC, CSS, FES, FOR, FW, NR, or RNG

Total=30

UNDERGRADUATE MINORS

NATURAL RESOURCES MINOR

Also available via Ecampus.

Students majoring in other programs at OSU can choose to complete the Natural Resources minor. The minor is intended to provide a broad exposure to the natural resources field. It offers course work that integrates a number of natural resource disciplines.

Choose four of the following five courses:

FES 251. Recreation Resource Management (4)

FOR 111. Introduction to Forestry (3)

FW 251. Principles of Fish and Wildlife Conservation (3)

NR 201. Managing Natural Resources for the Future (3)

RNG 341. Rangeland Ecology and Management (3)

One upper-division course from each of the following breadth requirements courses list:

Land and Water (3–5)

Political Dimensions (3–4)

Resource Values/Philosophy (3)

Any additional classes from the breadth requirements course list to total 28 credits.

Total=28

RECREATION RESOURCE MANAGEMENT MINOR

Students may elect to earn the Recreation Resource Management minor. This minor provides basic knowledge about recreation resource planning and management.

Core

FES 251. Recreation Resource Management (4)

FES 351. Recreation Behavior and Management (4)

FES 352. Wilderness Management (3)

FES 356. Recreation Resource Planning (4)

Select 9 credits from:

FES 432. Economics of Recreation Resources (4)

FES 444. Ecological Aspects of Park Management (3)

FES 453. Nature-Based Tourism (3)

FES 493. Environmental Interpretation (4)

FES 495. Interpretive Projects (2)

Total=27

TOURISM AND OUTDOOR LEADERSHIP MINOR

The Tourism and Outdoor Leadership program is only available at the OSU-Cascades Campus. Corvallis Campus students may enroll in the program but will have to attend some courses in Bend.

All lower-division courses listed below are Central Oregon Community College courses.

Lower Division (12 credits)

FOR 255. Resource Interpretation (3) (COCC course)

Plus 9 credits from the following COCC courses:

HHP 253. Wilderness Advanced First Aid (3)

or HHP 255. Outdoor Living Skills (3)

or HHP 294RC. Teaching Rock Climbing (3)

or HHP 294CC. Challenge Course Practices (3)

or HTRM 233. Event Planning (3)

or HHP 294WG. Whitewater Raft Guiding (3) (*only one of these skills courses can be taken in the minor*)

HHP 111. Introduction to Outdoor Leadership (3)

HHP 244. Psychology of Risk and Adventure (3)

HHP 271. Facilitating Group Experiences (3)

HHP 273. Outdoor Recreation Leadership (3)

Upper Division (15 credits)

FOR 371. Eco and Adventure Tourism (3)

or FOR 373. Wilderness and Adventure Education (4)

Both of the above may be taken, with the additional credits counting toward the 15 required.

Plus additional credits from other upper-division TOL courses for a total of 15 credits:

FOR 372. Ethics in Adventure Leadership (3)

FOR 375. ^Experiential Education (4)

FOR 377. Expeditions I (4)

FOR 378. Tourism and Recreation Data Analysis (3)

FOR 471. Sustainability in Tourism and Outdoor Leadership (3)

FOR 474. Entrepreneurship in Tourism and Outdoor Leadership (3)

FOR 476. Risk Management in Tourism and Outdoor Leadership (3)

FOR 478. Legal Issues in Tourism and Outdoor Leadership (3)

FOR 479. *Nature and the Human Experience (3)

Total=27

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

GRADUATE MAJORS**FOREST ECOSYSTEMS AND SOCIETY (MF, MS, PhD, MAIS)****Graduate Areas of Concentration**

Forest biology (MF only); forest, wildlife and landscape ecology; genetics and physiology; integrated social and ecological systems; silviculture (MF only); science of conservation, restoration and sustainable management; social science, policy, and natural resources; soil-plant-atmosphere continuum; sustainable recreation and tourism

This graduate program combines a strong social science faculty with a strong biological and ecological science faculty and so provides an unusual opportunity to focus on the interface of social science and ecology. The FES graduate program provides specific disciplinary opportunities in both ecological and social sciences in the natural resource setting but also strives to develop interdisciplinary skills and knowledge. *Our program objective is to develop interdisciplinary thinkers, highly capable scientists, and natural resource leaders who are prepared to solve complex socio-ecological problems.* The students will be able to identify and contribute to collaborative solutions in ecology and natural resources-related social science.

All Forest Ecosystems and Society graduate majors and master's level areas of concentration can be utilized by students in the College of Forestry's Peace Corps Master's International Program.

Master of Forestry (MF) in Forest Ecosystems—Areas of Concentration

1. **Forest Biology.** Management of natural resources is an increasingly complex and technical undertaking. In some cases, breadth or depth of specialization beyond the BS degree is required or is highly desirable in entry-level professional forestry positions or for advancement in non-research professional forestry positions. The MF in Forest Biology program emphasizes graduate course work in one of five areas of emphasis in forest biology, with supporting work in another area. The program can be completed in 12 months, but it may be extended in accordance with personal needs and the policies of the OSU Graduate School.
2. **Silviculture.** The MF in Silviculture program provides graduate-level preparation in the full range of disciplines essential for analyzing opportunities, solving problems, and making decisions in silviculture and forest resource management. Graduates from

this program must demonstrate competence in the preparation of well-documented silvicultural prescriptions and in the supervision of prescription implementation. The program also provides the background for sustained career development in forest resource management.

Master of Science and Doctor of Philosophy in Forest Ecosystems and Society—Areas of Concentration

MS and PhD students may focus their work in one of these areas of concentration or a hybrid of them: forest, wildlife and landscape ecology; genetics and physiology; integrated social and ecological systems; science of conservation, restoration and sustainable management; social science, policy, and natural resources; soil-plant-atmosphere continuum; sustainable recreation and tourism

1. **Forest, Wildlife and Landscape Ecology.** The many dimensions of biodiversity are the topic of this area of concentration. Species and communities of species, act, react and interact at many spatial and temporal scales. These dynamics take place in an environment that can change gradually or quite rapidly and that can have a large impact on dynamics through direct and indirect effects on species and inter-specific relationships.
2. **Genetics and Physiology.** The genetic and physiological mechanisms, from the scale of molecules and tissues to whole organisms, populations, and species, that determine how plants grow, reproduce, respond to environment, and are managed and modified for human benefit.
3. **Integrated Social and Ecological Systems.** Many issues in the broad natural resources arena are truly interdisciplinary across the biophysical and the social sciences. This area of concentration focuses on the integration of these sciences in developing basic concepts and in resolving management issues.
4. **Science of Conservation, Restoration and Sustainable Management.** The bases for these integrated sciences are found in the more basic biophysical and social sciences but their application to these complex goals generates new scientific challenges. This area of concentration seeks to develop these new scientific understandings.
5. **Social Science, Policy, and Natural Resources.** Exploration of social, human dimensions, and policy aspects of natural resource issues by examining linkages among

humans, society, and the natural resources on which humans and society depend.

6. **Soil-Plant-Atmosphere Continuum.** The movement of energy and matter within and among ecosystems controls how these systems function and the services they provide. This area of concentration investigates the mechanisms controlling ecosystem behavior over a range of levels from the whole-plant to the globe.
7. **Sustainable Recreation and Tourism.** Social and/or ecological topics in sustainable recreation and tourism including recreation and tourism behavior; social and/or ecological impacts; and planning, management, and policy.

For more information, contact the head of the department or any faculty member.

NATURAL RESOURCES (MNR)**Graduate Areas of Concentration**

Fisheries management, geographic information science (GIScience), marine resources management, sustainable natural resources, water conflict management and transformation

The MNR is a 45-credit online degree program with curriculum organized into three sections: core (18 credits), area of emphasis (18 credits), and capstone project (9 credits). **It will be taught entirely online through OSU Ecampus, although it may be possible for some students to work toward the MNR degree while in-residence at OSU.** Most of the courses for the MNR degree are already taught both in-residence and online, although some modification to certain in-residence courses will be necessary to be included in the proposed online curriculum.

The MNR degree will be offered as a non-thesis option only, similar to a Master of Business Administration, Master of Agriculture, or Master of Forestry. The MNR curriculum will facilitate learning by natural resource professionals who work in settings that require cross-disciplinary competency to find solutions to natural resource problems. Integration of multiple disciplines occurs through the curriculum, assignments, and a case study project. All MNR students will integrate concepts and approaches developed throughout the entire program to complete a final case study project.

Core Courses

18 credits are required from three thematic areas. These must be courses that are not already being used to satisfy units in the area of emphasis.

Theme: Overview/Introduction (3)
MNR 511. Introduction to Sustainable Natural Resources (3)

Theme: Ecology/Production (6)

- CSS 599. Special Topics in Crop Science and Social Science (1–3)
 FES 537. Belowground Ecosystems (3)
 FES 536. Carbon Sequestration in Forests (2)
 FES/FW 545. Ecological Restoration (4)
 FS 548. Biology of Invasive Plants (3)
 FW 527. Principles of Wildlife Diseases (4)
 FW 535. Wildlife in Agricultural Ecosystems (3)
 FW/HSTS 570. Ecology and History: Landscapes of the Columbia Basin (3)
 FW 579. Wetlands and Riparian Ecology (3)
 FW 581. Wildlife Ecology (4)
 MNR 530. Tropical Forest Ecology and Management (3)
 RHP 583. Radiation Biology (4)
 RHP 588. Radioecology (3)
 SNR 530. Ecological Principles of Sustainable Natural Resources (3)
 SNR 531. Sustainable Silviculture (1)
 SNR 532. Planning Agroforestry Projects (2)
 SNR 533. Alternative Forest Products (1)
 SNR 534. Reduced Impact Timber Harvest (1)
 SNR 535. Sustainable Management of Aquatic/Riparian Resources (1)

Theme: Human Systems (6 credits from at least 3 of the 5 areas)**Economics**

- AREC 534. Environmental and Resource Economics (3)
 SNR 521. Economics of Sustainable Natural Resources (3)

Policy

- FW 620. Ecological Policy (3)
 GEO 599. Special Topics (1–3)
 PS 575. Environmental Politics and Policy (4)
 PS 577. International Environmental Politics and Policy (4)

Sociology

- FW/SOC 585. Consensus and Natural Resources (3)
 SOC 526. Social Inequality (4)
 SOC 580. Environmental Sociology (4)
 SOC 581. Society and Natural Resources (4)
 SNR 520. Socially Sustainable Natural Resources (3)

Ethics

- PHL 540. Environmental Ethics (3)
 PHL 543. World View and Environmental Values (3)
 SNR 522. Basic Beliefs and Ethics in Natural Resources (1)
 WGSS 550. Ecofeminism (3)
 WGSS 525. Gender and Technology (3)

Communication

- COMM 59X. Environmental Conflict Resolution (3) **[Pending submission and approval of a proposal]**
 FES 593. Environmental Interpretation (4)
 GEO 518. Geosciences Communication (3)
 PS 515. Politics and the Media (4)

Theme: Methodology (select 3 cr)

- BOT 540. Field Methods in Plant Ecology (4)
 CH 590. Computer Programming for Scientists (3)
 FS 523. Natural Resources Data Analysis (4)
 GEO 565. Geographic Information Systems and Science (3)

- GEO 580. Advanced GIS Applications in the Geosciences (4)
 ST 511. Methods of Data Analysis (4)
 ST 512. Methods of Data Analysis (4)

Area of Emphasis (18 credits)

Students may select a certificate listed below or design their own option. A certificate may not be used to satisfy core requirements.

Master of Natural Resources

Contact: Badege Bishaw

Geographic Information Science (GIScience)

Contact: Kuuipo Walsh

Marine Resources Management (MRM)

Contact: Michael Harte

Sustainable Natural Resources (SNR)

Contact: Badege Bishaw

Water Conflict Management and Transformation (WCMT)

Contact: Lynette de Silva

Fisheries Management

Contact: Dan Edge or Selina Heppell

OR**Design own option (no certificate)**

Contact: Badege Bishaw

Capstone Project (9 credits)**Choose one option below:**

- Option 1:** MNR 560. Master's Case Study (9)
Option 2: 6–7 credits of MNR plus 2–3 credits from independent study project that was completed as part of an 18-credit graduate certificate.

CERTIFICATES**SUSTAINABLE NATURAL RESOURCES GRADUATE CERTIFICATE****Available Online Only.**

The Sustainable Natural Resources graduate certificate is an 18-credit interdisciplinary program offered online through OSU Extended Campus. Students have a choice among 12 courses designed to build personal and organizational capacity to examine the many aspects of natural resource problems—environmental, economic, and social—in the search for innovative solutions. *The courses are organized into three main sections: integration, human dimensions, and ecology and management of sustainable natural resources.* All courses in the certificate program are integrated through an independent capstone project that addresses a specific sustainability problem in the student's own organization or region. Throughout the program, students will work with faculty members and other students, and under the guidance of an assigned mentor to design and complete the project's work plan.

Traditional university training provides rigor in individual disciplines. However, natural resource problems require synthesis of multiple perspectives and fields of knowledge. In addition, natural resource problems can be international in scope. Globalization clearly reveals how decisions and practices in any part

of the world affect natural resources elsewhere, and highlights a need for natural resource professionals who can apply multidisciplinary systems-thinking to address these complex issues. The SNR graduate certificate program is designed to meet that need.

By offering this program as an online series of courses, it is possible for people from around the world to participate and to receive their graduate certificate without having to take a leave of absence from their work. The opportunity to collaborate with natural resource managers or graduate students from other regions or countries offer all participants a broader perspective on management issues and potential solutions.

For additional information and advising, contact **Badege Bishaw**, Program Director, 208 Richardson Hall, Oregon State University, Corvallis, OR 97331; 541-737-9495, badege.bishaw@oregonstate.edu.

More information, including international admissions requirements, may also be found at <http://ecampus.oregonstate.edu/online-degrees/graduate/sustainability>.

■ FOREST ECOSYSTEM AND SOCIETY COURSES**FES 115. ECOLOGY OF OREGON COAST FOREST (1).**

A combination of lecture, lab, and field exercises to explore the ecology and development of Oregon coastal forests. Lec/lab. Graded P/N.

FES 141. TREE AND SHRUB IDENTIFICATION (3).

Learn to identify the principal forest trees of North America, and the principal trees and shrubs of the Pacific Northwest. Also learn about forested regions of the world, and the structure and function of forest plants. Lec/lab/rec.

FES 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

FES 207. CAREER DEVELOPMENT (1).

Provides an opportunity to explore natural resource-focused careers in an informal, discussion-based class. Skills include job searching, resume/interview preparation, and considering the range of career possibilities. **PREREQS:** Recreation Resource Management, Forest Management, or Natural Resources majors only.

FES 240. *FOREST BIOLOGY (4). Forest plants and animals, communities, and ecosystems, their functioning and their relationship to resource management. Field trips required. Lec/lab/rec. (Bacc Core Course)

FES 241. DENDROLOGY (5). Learn to identify the principal forest trees of North America, and the principal trees and shrubs of the Pacific Northwest, including the ranges over which they grow, important ecological characteristics, and principal uses. Also learn about forested regions of the world, and the structure and function of forest plants. Lec/lab/rec.

FES 242. FOREST PLANTS OF THE PACIFIC NORTHWEST (4).

Field course on the identification and ecology of forest trees, shrubs, and herbs of the Pacific Northwest. Hybrid course with online course work and five required weekend field trips.

FES 251. RECREATION RESOURCE MANAGEMENT (4).

Overview of recreation resource management including study of land and water resources used for outdoor recreation. The

planning and management of natural and cultural resources for long-term resource productivity, with a focus on rural and wildlife areas of the forest, range and coast.

FES 341. FOREST ECOLOGY (3). Basic physiological characteristics of trees, succession, climax, and related concepts. Vegetation classification. Stand structure, diversity, competition, growth, soils-forests interactions, biomass and nutrient distribution, energy relations, nutrient element dynamics, ecology of disturbances.

FES 342. FOREST TYPES OF THE NORTHWEST (3). Forest trees in nature are aggregated into stable or transitory associations known as forest cover types. Knowledge of forest cover types, their species composition and ecology, is applicable to the fields of forestry, fire management, wildlife management, and forest ecology.

FES 350. URBAN FORESTRY (3). Introduction to principles and practices of planting and managing trees as a system of urban environment; understanding the economic, environmental, social aspects of urban forests, and an overview of contemporary land use issues and societal perspectives between people and plants. **CROSSLISTED** as HORT 350. **PREREQS:** Foundational forestry and horticulture courses are recommended.

FES 351. RECREATION BEHAVIOR AND MANAGEMENT (4). Principles of human behavior as used in the analysis of recreation management issues. Sociological and psychological approaches are emphasized.

FES 352. WILDERNESS MANAGEMENT (3). Wilderness as land use concept. Wilderness history, preservation, planning and management. Wilderness in the context of other land uses.

FES 355. MANAGEMENT FOR MULTIPLE RESOURCE VALUES (3). Management of a variety of resource attributes in multiple use context, including considerations for recreation, fish, wildlife, aesthetics, watersheds, and forest products. This course is repeatable for a maximum of 6 credits.

FES 356. RECREATION RESOURCE PLANNING (4). Theory and function of recreation resource planning. Techniques for collection, storage, analysis and display of planning data. Practice in use of recreation planning models. Lec/lab. **PREREQS:** (FES 251 or FOR 251) and (ST 351* or ST 351H*)

FES 360. COLLABORATION AND CONFLICT MANAGEMENT (3). Conflict assessment, negotiation, and consensus building in contentious forest resource situations. Topics addressed include conflict and negotiation theory, collaboration principles, analysis techniques to determine when collaboration might be fruitful, and approaches to joint fact-finding and mutual learning in public and private forest management. Specific cases of real conflicts in forest management will be examined.

FES 365. *ISSUES IN NATURAL RESOURCES CONSERVATION (3). Background of major current issues in natural resources conservation with emphasis on forests, soils, and water and potential sustainable carrying capacity. Focus on evaluating facts and opinions related to issues. Basics of terrestrial and aquatic ecology, recent and current issues of soil, water, and forest use and management. (Bacc Core Course)

FES 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

FES 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

FES 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

FES 415. FOREST INSECT AND DISEASE MANAGEMENT (5). Effects of insects and diseases on forest ecosystems. Recognition of important groups, prediction of pest responses to environmental changes, and management strategies for protection of forest resources. Field trips. Lec/lab/rec. **CROSSLISTED** as BOT 415. **PREREQS:** BI 213 or BI 213H

FES 422. RESEARCH METHODS IN SOCIAL SCIENCE (4). An introduction to research methods applied to social science issues and problems. Emphasis is on the nature of the research process, how to conduct research, and how to interpret and disseminate research results. Lec/lab. **CROSSLISTED** as TOL 422. **PREREQS:** ST 351 or ST 351H

FES 432. ECONOMICS OF RECREATION RESOURCES (4). Application of economic concepts to forest recreation management and resource allocation. Demand, supply, and valuation of both market and non-market forest recreation resources. Benefit-cost analysis applied to a recreation management project. **PREREQS:** (ECON 201 or ECON 201H) and (ST 351 or ST 351H)

FES 435. *GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK (3). A multidisciplinary course that examines the scientific, social, political, economic, environmental, and ethical controversies surrounding agricultural and natural resource biotechnologies. Lec/rec. **CROSSLISTED** as BI 435/BI 535, MCB 535, TOX 435/TOX 535. (Bacc Core Course)

FES 439. ^HUMAN DIMENSIONS OF FISHERIES AND WILDLIFE MANAGEMENT (3). Students build an understanding and appreciation for the role of human dimensions (HD) in fisheries and wildlife management. Students work both independently and in groups on assignments with an HD focus. **CROSSLISTED** as FW 439. (Writing Intensive Course) **PREREQS:** Principles of fish and wildlife conservation or natural resources and introductory statistics.

FES 444. ECOLOGICAL ASPECTS OF PARK MANAGEMENT (3). Ecological principles applied to the management of park recreation uses. The relationship between biological and physical science information and recreation management decisions is explored. **CROSSLISTED** as TOL 444. **PREREQS:** (FES 251* or FOR 251*) plus an ecology course.

FES 445. ECOLOGICAL RESTORATION (4). Fundamentals of restoring and reclaiming disturbed landscapes and ecosystems. Topics to be covered include types and assessment of site conditions; determining restoration goals and feasibility; hydrologic, biotic, and soil functions and their importance in restoration; and measures of successful restoration. Lec/lab/rec. **CROSSLISTED** as FW 445. **PREREQS:** BI 370 or BI 370H and /or instructor approval required.

FES 447. ARBORICULTURE (4). The principles and practices of arboriculture, the art and science of selecting, planting, establishing and maintaining trees in urban, suburban, commercial and residential landscapes. Lec/lab. **CROSSLISTED** as HORT 447. **PREREQS:** (FES 141 or FES 241 or HORT 226 or HORT 228) and (FOR 111 or HORT 112)

FES 451. HISTORY AND CULTURAL ASPECTS OF RECREATION (4). Role of conservation and outdoor recreation in U.S. environmental history. American attitudes toward nature. Evaluation of major governmental land and water policies. Evolution of the national parks and forests systems. Significant leaders in the parks movement. Role of cultural resources in recreation and parks.

FES 452. BIODIVERSITY CONSERVATION IN MANAGED FORESTS (3). Designed for students in forestry, wildlife, fisheries and related fields. Introduces the concepts of, and approaches to,

managing forest stands, landscapes and regions to achieve desired habitat conditions for indicator species and conservation of biological diversity. **CROSSLISTED** as FW 452. **PREREQS:** FES 240 or FES 341 or BI 370

FES 453. NATURE-BASED TOURISM (3). The relationship between natural resource-based recreation and tourism. Issues of tourism planning, management and impacts are explored.

FES 454. MANAGING AT THE WILDLAND-URBAN INTERFACE (3). Course targets fire-prone communities where resource professionals need to work cooperatively with local and federal agencies and citizens to gain acceptance for fire management programs and build joint responsibility for fuel reduction activities. **PREREQS:** FOR 111 (Not required of Ecampus students)

FES 455. URBAN FOREST PLANNING, POLICY AND MANAGEMENT (4). Examination of planning, policy, and management strategies used in the stewardship of urban natural resources. Fundamentals for developing effective programs to maximize the economic, environmental, and social values and benefits of urban forest landscapes. **CROSSLISTED** as HORT 455. **PREREQS:** FES 350 or HORT 350

FES 470. INTERORGANIZATIONAL ISSUES IN NATURAL RESOURCE MANAGEMENT (3). Understanding the motivations of organizational actors around shared problem solving is important for anyone anticipating a career in natural resources management. The study of organizations can provide important insights regarding various actors' behaviors and perspectives in joint planning. Knowledge gained from the class is transferable to other multi-organizational management settings. **PREREQS:** Junior undergraduate standing.

FES 485. *CONSENSUS AND NATURAL RESOURCES (3). Students will use a working group approach. They will select a natural resource topic, study the team process and interaction as a method of learning, explore the issue using systems practice, and strive for consensus on solutions to their issue. **CROSSLISTED** as ANS 485/ANS 585, FS 485/FS 585, FW 485/FW 585, SOC 485/SOC 585. (Bacc Core Course)

FES 492. ECOSYSTEM SERVICES ECOLOGY, SOCIOLOGY, POLICY (3). Ecosystem services such as clean water provision, carbon sequestration, and biodiversity protection are increasingly valued by society. This course explores the complex ecological, policy, and sociological dimensions of ecosystem services, especially relative to private lands. This course is repeatable for a maximum of 6 credits. **PREREQS:** Senior standing.

FES 493. ENVIRONMENTAL INTERPRETATION (4). Interpretation of natural and cultural features in parks, museums, and similar settings. Emphasis on learning and applying effective communication techniques in the development of brochures, exhibits, talks, museums, and visitor centers.

FES 495. INTERPRETIVE PROJECTS (2). Development of specific natural and cultural resource interpretive projects including interpretive plans, brochures, audiovisual programs and displays. **PREREQS:** FOR 493 or FES 493

FES 499. SELECTED TOPICS IN FOREST SCIENCE (1-16). In-depth studies of specific topics within a field of specialization. Examples include biotechnology in forestry, mycorrhizal ecology, tree improvement, landscape ecology, global climatic change in relation to forestry, advanced silviculture prescriptions, agroforestry, and others. This course is repeatable for a maximum of 16 credits.

FES 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

FES 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

FES 505. READING AND CONFERENCE (1-16). Some sections graded P/N. This course is repeatable for a maximum of 16 credits.

FES 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

FES 507. SEMINAR (1-16). Some sections graded A-F. This course is repeatable for a maximum of 16 credits.

FES 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

FES 511. COMMUNITIES AND NATURAL RESOURCES (5). Provides students from diverse backgrounds with interdisciplinary, experiential learning exposure to contemporary community and natural resource issues in rural Oregon. Social science concepts are employed to critically appraise current conditions and future prospects for rural, natural resource-dependent communities. This course is repeatable for a maximum of 15 credits.

FES 515. FOREST INSECT AND DISEASE MANAGEMENT (5). Effects of insects and diseases on forest ecosystems. Recognition of important groups, prediction of pest responses to environmental changes, and management strategies for protection of forest resources. Field trips. Lec/lab/rec. CROSSELLISTED as BOT 515. **PREREQS:** BI 213 or BI 213H

FES 520. POSING RESEARCH QUESTIONS (3). Acquaints beginning graduate students in the natural resources to the scientific method and formation of good researchable questions. The course consists of lectures, readings and discussions. Concepts in the course are reinforced and amplified by discipline-specific companion modules. Students prepare and orally present a researchable question in their area of interest that is critiqued by the class and instructors.

FES 521. NATURAL RESOURCE RESEARCH PLANNING (3). Research planning and study plan development, investigative procedures, the principles and ethics of natural resource science, principles and practices in scientific communication.

FES 522. RESEARCH METHODS SOCIAL SCIENCE (4). An introduction to research methods applied to social science issues and problems. Emphasis is on the nature of the research process, how to conduct research, and how to interpret and disseminate research results. Lec/lab. **PREREQS:** Upper-division or graduate level statistics.

FES 523. QUANTITATIVE ANALYSIS IN SOCIAL SCIENCE (4). Application and interpretation of statistical approaches to human dimensions of natural resources, recreation, and other social sciences. Emphasis is on an applied approach focusing on understanding data, selecting appropriate statistics for theoretical and managerial problems, using statistical software for analyses, and interpreting findings. **PREREQS:** (FES 522 or FOR 522) or equivalent and ST 511 or equivalent. Discuss course equivalency with professor.

FES 524. NATURAL RESOURCES DATA ANALYSIS (4). Hands-on experience in applied statistical modeling and data analysis for natural resources. Emphasis is on understanding of statistical models and the application and actual implementation of statistical analysis techniques, use of statistical software for analyses (e.g., R), and interpretation of findings. Students analyze data from their own research for final projects. **PREREQS:** ST 511 and ST 512

FES 532. ECONOMICS OF RECREATION RESOURCES (4). Application of economic concepts to forest recreation management and resource allocation. Demand, supply, and valuation of both market and non-market forest recreation resources. Benefit-cost analysis applied

to a recreation management project. **PREREQS:** ECON 201 and ST 351

FES 535. GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK (1-3). A multidisciplinary course that examines the scientific, social, political, economic, environmental, and ethical controversies surrounding agricultural and natural resource biotechnologies. Lec/lab/rec. CROSSELLISTED as BI 435/BI 535, MCB 535, TOX 435/TOX 535.

FES 536. CARBON SEQUESTRATION IN FORESTS (2). Examines processes controlling the sequestration of carbon in the forest system including the forest itself and wood products. Also examines how forests can be managed to sequester carbon as well as the important economic, policy, and other constraints. Lectures, readings, discussion, simulation models, and home work will be used to cover the material. **PREREQS:** Undergraduate-level biology or ecology.

FES 537. BELOWGROUND ECOSYSTEMS (3). Physical and biological components and their interactions in different soil ecosystems with description and examination of the relationships between producers and decomposers in the soil. **PREREQS:** Undergraduate level Biology or Ecology courses. BS degree in arts, humanities or science.

FES 543. ADVANCED SILVICULTURE (3). The scientific basis of forest regeneration and silvicultural practices and prescriptions in immature and mature stands. Field trips are required. Lec/lab. **PREREQS:** FOR 442 and FOR 443

FES 544. ECOLOGICAL ASPECTS OF PARK MANAGEMENT (3). Ecological principles applied to the management of park recreation uses. The relationship between biological and physical science information and recreation management decisions is explored. **PREREQS:** (FES 251 or FOR 251) and an ecology course.

FES 545. ECOLOGICAL RESTORATION (4). Fundamentals of restoring and reclaiming disturbed landscapes and ecosystems. Topics to be covered include types and assessment of site conditions; determining restoration goals and feasibility; hydrologic; biotic, and soil functions and their importance in restoration; and measures of successful restoration. CROSSELLISTED as FW 545. **PREREQS:** BI 370 or instructor approval required.

FES 546. ADVANCED FOREST COMMUNITY ECOLOGY (4). Fundamental concepts of community including disturbance, diversity and succession. Strong emphasis on field skills and data interpretation. Saturday field trip required. Lec/lab.

FES 547. ARBORICULTURE (1-4). The principles and practices of arboriculture, the art and science of selecting, planting, establishing and maintaining trees in urban, suburban, commercial and residential landscapes. Lec/lab. CROSSELLISTED as HORT 547.

FES 548. BIOLOGY OF INVASIVE PLANTS (3). Concepts of plant physiology, genetics and population dynamics are used to understand how plant invasions occur and some communities continue to exist. Management implications are explored. **PREREQS:** One year biological science; BOT 341 and BOT 442 recommended.

FES 551. HISTORY AND CULTURAL ASPECTS OF RECREATION (4). Role of conservation and outdoor recreation in U.S. environmental history. American attitudes toward nature. Evaluation of major governmental land and water policies. Evolution of the national parks and forests systems. Significant leaders in the parks movement. Role of cultural resources in recreation and parks.

FES 553. NATURE-BASED TOURISM (3). The relationship between natural resource-based recreation and tourism. Issues of tourism planning,

management and impacts are explored.

FES 554. MANAGING AT THE WILDLAND-URBAN INTERFACE (3). Course targets fire-prone communities where resource professionals need to work cooperatively with local and federal agencies and citizens to gain acceptance for fire management programs and build joint responsibility for fuel reduction activities. **PREREQS:** FOR 111 (Not required of Ecampus students)

FES 555. URBAN FOREST PLANNING, POLICY AND MANAGEMENT (4). Examination of planning, policy, and management strategies used in the stewardship of urban natural resources. Fundamentals for developing effective programs to maximize the economic, environmental, and social values and benefits of urban forest landscapes. CROSSELLISTED as HORT 555. **PREREQS:** FES 350 or HORT 350 for undergraduates.

FES 558. CONCEPTS OF FOREST RECREATION PLANNING AND MANAGEMENT (3). Examines research that forms the conceptual basis for tools, techniques, and approaches used in recreation planning and management. **PREREQS:** Senior or graduate standing.

FES 561. PHYSIOLOGY OF WOODY PLANTS (3). The structure, growth and physiological processes of trees and shrubs. **PREREQS:** CH 221 and CH 222 and CH 223 and CH 331 and CH 332 and BOT 331

FES 570. INTERORGANIZATIONAL ISSUES IN NATURAL RESOURCE MANAGEMENT (3). Understanding the motivations of organizational actors around shared problem solving is important for anyone anticipating a career in natural resources management. The study of organizations can provide important insights regarding various actors' behaviors and perspectives in joint planning. Knowledge gained from the class is transferable to other multi-organizational management settings. **PREREQS:** Junior undergraduate standing.

FES 585. CONSENSUS AND NATURAL RESOURCES (3). Students will use a working group approach. They will select a natural resource topic, study the team process and interaction as a method of learning, explore the issue using systems practice, and strive for consensus on solutions to their issue. CROSSELLISTED as ANS 485/ANS 585, FW 485/585, SOC 485/SOC 585.

FES 592. ECOSYSTEM SERVICES ECOLOGY, SOCIOLOGY, POLICY (3). Ecosystem services such as clean water provision, carbon sequestration, and biodiversity protection are increasingly valued by society. This course explores the complex ecological, policy, and sociological dimensions of ecosystem services, especially relative to private lands. This course is repeatable for a maximum of 6 credits. **PREREQS:** Senior standing.

FES 593. ENVIRONMENTAL INTERPRETATION (4). Interpretation of natural and cultural features in parks, museums, and similar settings. Emphasis on learning and applying effective communication techniques in the development of brochures, exhibits, talks, museums, and visitor centers.

FES 595. INTERPRETIVE PROJECTS (2). Development of specific natural and cultural resource interpretive projects including interpretive plans, brochures, audiovisual programs and displays. **PREREQS:** FES 593

FES 599. SELECTED TOPICS IN FOREST SCIENCE (1-16). In-depth studies of specific topics within a field of specialization. Examples include biotechnology in forestry, mycorrhizal ecology, tree improvement, landscape ecology, global climatic change in relation to forestry, advanced silviculture prescriptions, agroforestry, and others. This course is repeatable for a maximum of 16 credits.

FES 600. GLOBAL CHANGE ECOLOGY (3).

An interdisciplinary discourse on what is known about global change and dynamics of the earth system, including principles of climate, influences on ecosystem functioning and connectivity needed to understand responses of the earth system to human activities.

FES 601. RESEARCH AND SCHOLARSHIP (1-16).

This course is repeatable for a maximum of 16 credits.

FES 603. THESIS (1-16). This course is repeatable for a maximum of 255 credits.

FES 605. READING AND CONFERENCE (1-16).

This course is repeatable for a maximum of 16 credits.

FES 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

FES 629. TEACHING PRACTICUM IN FOREST SCIENCE (1).

Preparation of graduate students in forest science and related disciplines for their first teaching experiences. Using concepts and information introduced in the class, students will develop the curriculum for one credit of college-level instruction (or an equivalent approved by the instructor) in a topic of their choice.

FES 641. SUSTAINABLE DEVELOPMENT AND RENEWABLE RESOURCE ECONOMICS (3).

Economic models and analyses of renewable resource management and policy in developing countries. Concepts of sustainable development. Topics include incomplete markets, agricultural households, soils, deforestation, marine/fisheries, non-timber forest products, water resources, and biodiversity. **PREREQS:** AEC 613 or equivalent advanced microeconomic theory.

FES 646. FOREST ECOSYSTEMS ANALYSIS AND APPLICATION (4).

The structure and function of forests and associated streams in natural and managed landscapes; application of ecosystem analysis to policy management decisions; roles of models; scaling from individual processes to ecosystems, landscapes, and beyond. Required classroom discussions, field trip. **PREREQS:** College-level ecology/biology, chemistry, and math; familiarity with Excel.

FES 699. SELECTED TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

■ FOREST SCIENCE COURSES**FS 432. PLANNING AGROFORESTRY PROJECTS (2).**

Helps forestry and other natural resource students understand various agroforestry concepts, systems and technologies and practices world wide. Lays the groundwork for students to identify different systems, characterize socio-economic conditions and plan sustainable agroforestry systems. Class activities examine how biological, economic and social factors influence agroforestry farming decisions. **PREREQS:** BOT 341 and /or equivalent course in ecology.

FS 477. *AGROFORESTRY (3). Theory and worldwide practice of multiple-crop low input sustainable systems involving concurrent production of tree and agricultural products. Biological, economic, social, and political factors that underlie the application of agroforestry technology. **CROSSLISTED** as NR 477/NR 577, RNG 477/RNG 577. (Bacc Core Course) **PREREQS:** Any basic ecology course.

FS 485. *CONSENSUS AND NATURAL RESOURCES (3). Students will use a working group approach. They will select a natural resource topic, study the team process and interaction as a method of learning, explore the issue using systems practice, and strive for consensus on solutions to their issue. **CROSSLISTED** as ANS 485/585, FW 485/585, SOC 485/585. (Bacc Core Course)

FS 532. PLANNING AGROFORESTRY PROJECTS (2). Helps forestry and other

natural resource students understand various agroforestry concepts, systems and technologies and practices world wide. Lays the groundwork for students to identify different systems, characterize socio-economic conditions and plan sustainable agroforestry systems. Class activities examine how biological, economic and social factors influence agroforestry farming decisions. **PREREQS:** BOT 341 or equivalent course in ecology.

FS 547. NUTRIENT CYCLING (3). Reviews and discusses ecosystem-level biogeochemical concepts for terrestrial and freshwater ecosystems, primarily by reading and discussing classic and current literature to determine the state-of-knowledge and uncertainties associated with it. Topics will include root nutrient uptake mechanisms, soil chemical and biochemical transformations in different soil and ecosystems, measuring soil solution and watershed fluxes, soil organic matter formation and structure, the meaning of sustainability, the concept of N saturation in terrestrial ecosystems, and the use of natural abundance and tracer isotopes in ecosystem biogeochemistry. While forest biogeochemical processes will be emphasized, desert, aquatic, wetland, and prairie ecosystems will also be explored. **CROSSLISTED** as BOT 547 and SOIL 547. **PREREQS:** College-level chemistry and biology and one class in ecology (BI 370 or equivalent) and/or soils (e.g. SOIL 205).

FS 553. FOREST WILDLIFE HABITAT

MANAGEMENT (4). Management of terrestrial vertebrates in forest ecosystems. Effects on silvicultural practices and landscape pattern on habitats and populations. **CROSSLISTED** as FW 553. **PREREQS:** FOR 341 or equivalent course in ecology.

FS 577. AGROFORESTRY (3). Theory and worldwide practice of multiple-crop low input sustainable systems involving concurrent production of tree and agricultural products. Biological, economic, social, and political factors that underlie the application of agroforestry technology. **CROSSLISTED** as NR 477/NR 577, RNG 477/RNG 577. **PREREQS:** Any basic ecology course.

FS 585. CONSENSUS AND NATURAL RESOURCES (3). Students will use a working group approach. They will select a natural resource topic, study the team process and interaction as a method of learning, explore the issue using systems practice, and strive for consensus on solutions to their issue. **CROSSLISTED** as ANS 485/ANS 585, FS 485/FS 585, FW 485/FW 585, SOC 485/SOC 585. (Bacc Core Course)

■ MASTER OF NATURAL RESOURCES COURSES

MNR 511. INTRODUCTION TO SUSTAINABLE NATURAL RESOURCES (3). Overview of economic, environmental, social, cultural, ethical, and policy considerations of sustainable natural resource management. International collaborative efforts to address global natural resource issues. Key policy drivers, key stressors, balancing competing interests. Introductory course required for all Master of Natural Resources students; open to other graduate students. Taught via Ecampus only. **PREREQS:** Bachelor's degree. Recommended: Undergraduate biology or ecology course.

MNR 522. RESEARCH METHODS SOCIAL SCIENCE (4). An introduction to research methods applied to social science issues and problems. Emphasis is on the nature of the research process, how to conduct research, and how to interpret and disseminate research results. Lec/lab. **CROSSLISTED** as FES 522. **PREREQS:** Upper-division or graduate level statistics.

MNR 530. TROPICAL FOREST ECOLOGY AND MANAGEMENT: A GLOBAL PERSPECTIVE (3). Study of tropical forest ecology and the common

ecological patterns found within tropical forests. The threats and challenges that tropical forests face in the 21st century and the issues of human use and their impacts. Developing strategies for sustainable management and restoration approaches to alleviate pressure on remaining tropical forests. Taught via Ecampus only. **PREREQS:** Graduate standing. Highly recommended: Basic ecology course. Recommended: Students should have a bachelor's degree in the arts, humanities, or science and preferably at least two years of experience working in a natural resources-related field. Instructor approval required for students not meeting prerequisites.

MNR 560. MASTER'S CASE STUDY (1-9).

Capstone project integrating course work, readings, and assignments to address complex natural resource problems of local or regional importance. Taught via Ecampus only. Graded P/N. This course is repeatable for a maximum of 9 credits.

■ NATURAL RESOURCES COURSES**NR 201. MANAGING NATURAL RESOURCES FOR THE FUTURE (3).**

Overview of the complexities involved in managing natural resources of the Pacific Northwest. Exposure to major natural resource issues of the region. Development of critical thinking skills useful in seeking solutions.

NR 350. *SUSTAINABLE COMMUNITIES (4).

Introduction to the concept of sustainable communities from a multidisciplinary perspective. Instructors from a broad array of disciplines and professions. Development of holistic thinking skills and innovative solutions to complex problems. (Baccalaureate Core Course)

NR 401. RESEARCH AND SCHOLARSHIP (1-16).

This course is repeatable for a maximum of 16 credits.

NR 403. THESIS (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

NR 405. READING AND CONFERENCE (1-9).

This course is repeatable for a maximum of 18 credits.

NR 406. PROJECTS (1-9). This course is repeatable for a maximum of 16 credits.

NR 407. SEMINAR (1-9).

This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

NR 410. INTERNSHIP (1-6). This course is repeatable for a maximum of 12 credits.

NR 455. NATURAL RESOURCE DECISION MAKING (4).

Students will participate on collaborative planning teams that effectively engage stakeholders in the decision making process, and offer sound natural resource decisions that are supported by multiple interests. **PREREQS:** Senior standing.

NR 477. *AGROFORESTRY (3). Theory and worldwide practice of multiple-crop low input sustainable systems involving concurrent production of tree and agricultural products. Biological, economic, social, and political factors that underlie the application of agroforestry technology. **CROSSLISTED** as RNG 477/RNG 577, FS 477/FS 577. (Bacc Core Course) **PREREQS:** Any basic ecology course.

NR 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

NR 499H. SPECIAL TOPICS (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

NR 577. AGROFORESTRY (3). Theory and worldwide practice of multiple-crop low input sustainable systems involving concurrent production of tree and agricultural products.

Biological, economic, social, and political factors that underlie the application of agroforestry technology. CROSSLISTED as RNG 477/RNG 577, FS 477/FS 577. **PREREQS:** Any basic ecology course.

■ SUSTAINABLE NATURAL RESOURCES COURSES

SNR 506. INDEPENDENT PROJECT IN NATURAL RESOURCE SUSTAINABILITY (2). Student identify, pose, frame, and analyze the various components of an important natural resource sustainability problem within their country, region, or organization and, at the end of term, present a workplan for its resolution. Oral and written reports are expected. Graded P/N. **PREREQS:** Admission to SNR Graduate Certificate Program and non-degree/credential seeking students.

SNR 511. SUSTAINABLE NATURAL RESOURCE DEVELOPMENT (1). Using readings, class discussions, and field trips, we introduce the program sessions and pedagogical methods, familiarize students with basic working definitions of sustainability, and build capacity to work as group on a common project. **PREREQS:** This is an introduction to the 18-credit Graduate Certificate in Sustainable Natural Resources (SNR) and is also open to other graduate students and non-degree/credential seeking students. For students who have been admitted to the SNR Graduate Certificate Program, this course should be taken during the first term.

SNR 520. SOCIAL ASPECTS OF SUSTAINABLE NATURAL RESOURCES (3). Using readings, personal experiences, and class discussions, students explore five principles of socially sustainable natural resource management, and review the role they play in creating natural resource-based sustainable communities. **PREREQS:** Graduate standing. Highly recommended: SNR 511. Recommended: Students should have a bachelor's degree in the arts, humanities, or science and preferably at least two years experience working in a natural resources-related field. Students seeking the SNR Graduate Certificate should take SNR 511 their first term because it explains overall certificate program goals. There are no prerequisites for non-degree seeking students other than graduate standing. Part of the Sustainable Natural Resources Graduate Certificate program; also open to other graduate students and non-degree/credential seeking students.

SNR 521. ECONOMICS OF SUSTAINABLE NATURAL RESOURCE MANAGEMENT (3). Focuses on the sources of market failure, the means of correcting market failure, and the real-world examples of making progress toward sustainable resource use by means of market mechanisms. **PREREQS:** Recommended: Students should have a bachelor's degree in the arts, humanities, or science and preferably at least two years experience working in a natural resources-related field. Students seeking the SNR Graduate Certificate should take SNR 511 their first term because it explains overall certificate program goals. There are no prerequisites for non-degree seeking students other than graduate standing. Part of the Sustainable Natural Resources Graduate Certificate program; also open to other graduate students and non-degree/credential seeking students.

SNR 522. BASIC BELIEFS AND ETHICS IN NATURAL RESOURCES (3). Examines basic philosophies and ethical systems in American forestry, including Pinchot's agricultural/utilitarian approach and Leopold's biotic/ecological model, compares them to contemporary public attitudes and considers their implications for sustainability. **PREREQS:** Part of SNR Graduate Certificate, and also open to other graduate students and non-degree/credential seeking students.

SNR 530. ECOLOGICAL PRINCIPLES OF SUSTAINABLE NATURAL RESOURCES (3). Focus an ecological sustainability and ecological concepts and principles, with examples drawn from forests and arid lands. Exploration of global ecosystems, ecological processes and services, factors that create and maintain diversity, ecosystem health and integrity. Principles for sustainable natural resource management and use. **PREREQS:** Graduate standing. Highly recommended: Basic ecology course. Recommended: Students should have a bachelor's degree in the arts, humanities, or science and preferably at least two years experience working in a natural resources-related field. Students seeking the SNR Graduate Certificate should take SNR 511 their first term because it explains overall certificate program goals. There are no prerequisites for non-degree seeking students other than graduate standing. Part of the Sustainable Natural Resources Graduate Certificate program; also open to other graduate students and non-degree/credential seeking students.

SNR 531. SUSTAINABLE SILVICULTURE AND FOREST CERTIFICATION (3). Strategies for sustainable silviculture, and measuring and verifying environmental performance (including certification systems) are examined using classroom lectures, case studies, and field exercises. Part of the 18-credit Sustainable Natural Resources (SNR) Graduate Certificate; also open to other graduate students. **PREREQS:** Graduate standing. Recommended: Students should have a bachelor's degree in the arts, humanities, or science and preferably at least two years experience working in a natural resources-related field. Students seeking the SNR Graduate Certificate should take SNR 511 their first term because it explains overall certificate program goals. There are no prerequisites for non-degree seeking students other than graduate standing. Part of the Sustainable Natural Resources Graduate Certificate program; also open to other graduate students and non-degree/credential seeking students.

SNR 532. PLANNING AGROFORESTRY PROJECTS (2). Develop basic understanding and appreciation of agroforestry concepts, systems, technologies and practices as used and applied in tropical and temperate zones of the world. **PREREQS:** SNR 530 or equivalent course in ecology and SNR 511 are corequisites. Part of SNR Graduate Certificate; also open to other graduate students and non-degree/credential seeking students.

SNR 533. ALTERNATIVE (NONTIMBER) FOREST PRODUCTS (2). Explores the economic, environmental, and sociocultural components of understanding and managing alternative forest products, also known as nontimber forest products (NTFPs), while considering other natural/social resources. Part of the 18-credit Sustainable Natural Resources (SNR) Graduate Certificate; also open to other graduate students. **PREREQS:** Graduate standing. Recommended: Students should have a bachelor's degree in the arts, humanities, or science and preferably at least two years experience working in a natural resources-related field. Students seeking the SNR Graduate Certificate should take SNR 511 their first term because it explains overall certificate program goals. There are no prerequisites for non-degree seeking students other than graduate standing. Part of the Sustainable Natural Resources Graduate Certificate program; also open to other graduate students and non-degree/credential seeking students.

SNR 534. REDUCED IMPACT TIMBER HARVEST (2). Explores planning, implementation, monitoring, and evaluation of reduced impact timber harvesting. Part of the 18-credit Sustainable Natural Resources (SNR) Graduate Certificate; also open to other graduate students. **PREREQS:** Graduate standing. Recommended: Students should have a bachelor's degree in the arts,

humanities, or science and preferably at least two years experience working in a natural resources-related field. Students seeking the SNR Graduate Certificate should take SNR 511 their first term because it explains overall certificate program goals. There are no prerequisites for non-degree seeking students other than graduate standing and non-degree/credential seeking students.

SNR 535. SUSTAINABLE MANAGEMENT OF AQUATIC AND RIPARIAN RESOURCES (3). Explores integrated strategies for sustainable management of watersheds, estuaries, coastal zones, and aquatic resources. Special emphasis given to links between land uses and aquatic environments. Part of the 18-credit Sustainable Natural Resources (SNR) Graduate Certificate; also open to other graduate students. **PREREQS:** Graduate standing. Recommended: Students should have a bachelor's degree in the arts, humanities, or science and preferably at least two years experience working in a natural resources-related field. Students seeking the SNR Graduate Certificate should take SNR 511 their first term because it explains overall certificate program goals. There are no prerequisites for non-degree seeking students other than graduate standing. Part of the Sustainable Natural Resources Graduate Certificate program; also open to other graduate students and non-degree/credential seeking students.

SNR 540. GLOBAL ENVIRONMENTAL CHANGE (3). Explore biophysical and social sciences that underlie contemporary global change issues: global biogeochemical cycles, climate system, climate change, threats to biodiversity; human dimensions of climate change, globalization, land cover and land use change, global environmental governance and management tools. **PREREQS:** Graduate standing. Highly recommended: Basic biology course. Recommended: Bachelor's degree in arts, sciences, or humanities; preferably at least two years working in a natural resources-related field. Part of the SNR Graduate Certificate Program; also open to other graduate students and non-degree/credential seeking students.

SNR 808. WORKSHOP (1-4). This course is repeatable for a maximum of 4 credits.

SUS 304. *SUSTAINABILITY ASSESSMENT (4). Explores theories and application of sustainability assessment techniques and analysis methods. Practical application of globally recognized assessment protocol, including checklists, footprinting, life-cycle analysis and the indicators used to conduct these analyses. Emphasis on ecological and social indicators, although economic indicators are explored. (Bacc Core Course) **PREREQS:** NR 350 and NR 350

SUS 330. ECOLOGICAL DIMENSIONS OF SUSTAINABILITY (3). Students will explore regulating factors in ecosystems and major ecological goods and services that contribute to human welfare globally. Additional topics include biological diversity; ecological processes; disturbance; productivity; nutrient cycling; cumulative effects and lag times; carrying capacity; extinctions, land use/land cover change; and connections between ecological integrity and economic/social prosperity.

SUS 350. SUSTAINABLE COMMUNITIES (4). Introduction to the concept of sustainable communities from a multidisciplinary perspective. Instructors from a broad array of disciplines and professions. Development of holistic thinking skills and innovative solutions to complex problems. (Bacc Core Course)

SUS 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

SUS 410. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits.

SUS 420. SOCIAL DIMENSIONS OF SUSTAINABILITY (3). Focuses on the social aspects of sustainability, including how the

environment, the economy, social life interact to create the world we live in. Explores how social institutions (school, government, business, family) contribute to sustainability and promote or discourage social and environmental justice at local and global scales. Taught at OSU-Cascades only. **PREREQS:** NR 350

SUS 499. SPECIAL TOPICS (3). Taught at OSU-Cascades only. This course is repeatable for a maximum of 15 credits.

■ TOURISM AND OUTDOOR LEADERSHIP COURSES

TOL 371. ECO AND ADVENTURE TOURISM (3). Introduces students to eco and adventure tourism, including definitions and historical development, visitor motivations and market issues, business issues (including ethics and risk management), positive and negative impacts, and planning and management issues. Both domestic and international issues and examples will be covered.

TOL 372. ETHICS IN ADVENTURE TOURISM (3). Examines ethical issues and situations inherent in adventure leadership and other experiential education settings. Leading adventure programs entails judgment-laden decisions that are made every hour of every day with regards to participants, leaders, and programs. Students will become familiar with predominant ethical theories and apply these theories to practical situations with a view to assessing the values that influence their decisions and subsequent actions. Students will better understand how their decisions influence their professional work and those of others within the context of adventure leadership. **PREREQS:** FOR 375 or other writing intensive course

TOL 373. WILDERNESS AND ADVENTURE EDUCATION (4). Rationale for and methods used in the application of wilderness and outdoor adventure education programs in education, recreation, corporate and human service settings. Covers historical and contemporary philosophies and practices in adventure education, with a primary emphasis on outdoor adventure education. Explores the educational, social, and ethical consequences of outdoor adventure education programs. Also explores the role of wilderness in the context of the United States and differing views of what constitutes wilderness from an international perspective. **PREREQS:** FOR 375

TOL 374. TOURISM INFORMATION TECHNOLOGY (3). Covers the information technology needs of tourism and outdoor recreation businesses. Emphasis is placed on providing a thorough understanding of how e-marketing, e-commerce, and online information distribution are keys to commercial success. Students will develop, publish, and present a tourism-related e-newsletter, website, or PowerPoint presentation relating to a topic or company.

TOL 375. ^EXPERIENTIAL EDUCATION (4). Theory, techniques, and practice of experiential education. Students will define learning objectives, design curriculum, develop teaching materials, and effectively teach a variety of audiences. (Writing Intensive Course)

TOL 376. TOURISM AND OUTDOOR RECREATION FOR SPECIAL POPULATIONS (4). Introduces students to current philosophies of tourism and recreation programming and its application with groups of special populations. Students will explore the educational, social, and ethical implications of outdoor programs for special populations, while investigating cultural attitudes and behaviors toward selected special populations.

TOL 377. EXPEDITIONS I (4). Students will research, design, and plan a three- to four-week extended backcountry expedition. Content includes determination of expedition purpose, length, and location, followed by planning and

programming. Includes logistical arrangements, risk management procedures, and required permits. Students will design skill and knowledge progressions for participants. **PREREQS:** Instructor approval

TOL 378. TOURISM AND RECREATION DATA ANALYSIS (3). Introduces students to descriptive and inferential statistics. The focus is on 1) applying relevant statistical analyses to tourism and recreation data and 2) interpreting results. **PREREQS:** MTH 111

TOL 379. EXPEDITIONS II-LAND (10). Field-based course that develops the knowledge, skills, and dispositions needed to safely and effectively lead and participate in an extended land-based backcountry expedition of three weeks or longer. Includes a service component tied to a relevant local organization. **PREREQS:** FOR 377 and (HHP 253 (WAFSA) or Wilderness First Responder (WFR)) and HHP 111 and HHP 255 and HHP 271 and HHP 273 and (HHP 294WG or HHP 294RC) and instructor approval.

TOL 380. EXPEDITIONS II-WATER (3). Field-based course that develops the knowledge, skills, and dispositions needed to safely and effectively lead and participate in an extended water-based backcountry expedition of one week or longer. Includes a service component tied to a relevant local organization. **PREREQS:** FOR 377 and (HHP 253 (WAFSA) or Wilderness First Responder (WFR)) and HHP 111 and HHP 255 and HHP 271 and HHP 273 and (HHP 294WG or HHP 294RC) and instructor approval.

TOL 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

TOL 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

TOL 410. INTERNSHIP (1-16). Full-time supervised professional experience emphasizing functional proficiency under joint sponsorship of university and agency personnel. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** FOR 251 and FOR 351 and FOR 356 and FOR 391 and FOR 407-Section 020 are recommended and may be taken concurrently. Departmental approval required.

TOL 422. RESEARCH METHODS IN SOCIAL SCIENCE (4). An introduction to research methods applied to social science issues and problems. Emphasis is on the nature of the research process, how to conduct research, and how to interpret and disseminate research results. Lec/lab. **CROSSLISTED** as FES 422. **PREREQS:** FOR 251 and (ST 351 or ST 351H)

TOL 444. ECOLOGICAL ASPECTS OF PARK MANAGEMENT (3). Ecological principles applied to the management of park recreation uses. The relationship between biological and physical science information and recreation management decisions is explored. **CROSSLISTED** as FES 444. **PREREQS:** FOR 251* plus an ecology course.

TOL 471. SUSTAINABILITY IN TOURISM AND OUTDOOR LEADERSHIP (3). Covers the concept and application of sustainability in tourism and outdoor leadership (TOL). The history, concept, and definitions of sustainability in this field will be described. Students will learn the range of positive and negative impacts from TOL activities, as well as strategies and tools for managing them.

TOL 474. ENTREPRENEURSHIP IN TOURISM AND OUTDOOR LEADERSHIP (3). Creation and management of tourism and outdoor leadership businesses. Covers principles of running a successful business and includes special considerations for operations on public lands (e.g. concessionaires). **PREREQS:** BA 101

TOL 475. HOSPITALITY AND TOURISM MARKETING (3). Development and management of marketing in the hospitality and travel industry sectors, and positioning products or destinations to capture customers. Addresses differences between tourism and other industries. Students will develop a marketing plan.

TOL 476. RISK MANAGEMENT IN TOURISM AND OUTDOOR LEADERSHIP (3). Risk management in tourism and outdoor leadership from an operational perspective. Focuses on risk in tourism and outdoor education programs as a contributing factor for learning, growth, and satisfaction of client motivations. Covers the nature of accidents in outdoor settings, addresses the practitioner's perspective of risk in the field, and describes theories and methods of implementing risk management. Covers the ethics of utilizing risk and potentially dangerous activities as a basis for enhancing client education and experience. **PREREQS:** FOR 478

TOL 477. ADVENTURE THERAPY (3). Provides students with an overview of adventure therapy, including its history, theory, current status and future trends. Includes program design, ethical issues, and best practices in the field.

TOL 478. LEGAL ISSUES IN TOURISM AND OUTDOOR LEADERSHIP (3). Covers the legal dimensions of tourism and outdoor leadership activities. Students will learn about the civil and criminal judicial system from a tourism and outdoor leadership perspective. They will learn to apply risk management methodologies and instruments, such as contracts, insurance, waivers and releases to address legal liability. The basic principles of intentional and negligent torts will be discussed, with an emphasis on practical applications. Also covers employment issues and general business law, including business structure and the use of entities as liability shields. **PREREQS:** FOR 375

TOL 479. *NATURE AND THE HUMAN EXPERIENCE (3). Examines the human experience with (and within) nature from biological, psychological, spiritual, and international/cultural perspectives. Identifies opportunities for fostering the human-nature connection to achieve organizational goals and individual and societal health. (Bacc Core Course) **PREREQS:** FOR 375 or other equivalent WIC course.

TOL 499. SPECIAL TOPICS (1-16). Topics of current importance in forest resources issues, education, policies, economics, management, business, social values, silviculture, and biometrics. Topics will change from term to term. May be repeated with different topics for credit. Section 8: Social aspects of natural resource management (3 credits) graded. This course is repeatable for a maximum of 16 credits. **PREREQS:** Senior or graduate standing.

FOREST ENGINEERING, RESOURCES AND MANAGEMENT

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FACULTY

Professors P. Adams, Fitzgerald, J. Johnson, Kellogg, Landgren, Maguire, Montgomery, Reed, Rose, Sessions^{PE}, Tesch

Associate Professors Bailey, Bennett, Boston^{PE,RPF}, Bowers, Parker, Punches, Shaw, Skaugset^{RPF}, Temesgen

Assistant Professor Bladon, Chung, Hatten, Hilker, Leshchinsky, Powers, Segura, White, Wing^{PE,PLS}

Senior Instructors Huntington, Wimer

Instructor Kiser

Emeritus D. Adams, Atkinson, Bell, Boyle, Brodie, Brown, Elwood, Fletcher, Garland^{PE}, Hann, Hermann, Hobbs, Murphy, Newton, Olsen, Pyles^{PE}, Tappeiner, Walstad

ADJUNCT FACULTY

Arthur, Doescher, Hansen, Jensen, Miller, Ripple

COURTESY/AFFILIATE FACULTY

Bladon, Blahna, Brungardt, Cloughesy, Cushing, Danehy, Dombeck, Eglitis, Flowers, Gould, Harrington, Hummel, Ice, Jolly, Koo, Li, McDonnell, Mills, Monleon, Progar, Thompson, Vaillant, Volfoviez-Leon, Walters, Williams

^{PE} Registered Professional Engineer in one or more states

^{RPF} Registered Professional Forester in one or more states

^{PLS} Registered Professional Land Surveyor in one or more states

Undergraduate Majors

Forest Engineering (BS, CRED, HBS)
Forest Engineering-Civil Engineering
(Two BS degrees) (BS, CRED, HBS)
Forestry (BS, HBS)

Options

Forest Management
Forest Operations Management

Undergraduate Minor
Forestry

Graduate Major

Sustainable Forest Management
(MAIS, MF, MS, PhD)

Graduate Areas of Concentration

Engineering for Sustainable Forestry
Forest Biometrics and Geomatics
Forest Operations Planning and Management
Forest Policy Analysis and Management
Forest Watershed Management
Silviculture, Fire, and Forest Health

Affiliated Interdisciplinary

Graduate Major

Applied Economics (MA, MS, PhD)
(See Graduate School)

Water Resources Engineering
Water Resources Policy and Management
Water Resources Science

Graduate Minor

Sustainable Forest Management

The mission of the Department of Forest Engineering, Resources and Management (FERM) is to develop, communicate, and teach the science, knowledge and engineering necessary for the sustainable management of forest, land, and water resources to achieve economic, environmental, and social objectives. Teaching and research focus on support and enhancement of active forest management across the full range of owner objectives, from ecosystem restoration to timber production. FERM includes biologists, engineers, economists, biometricians, hydrologists, silviculturists and applied ecologists.

The Department of Forest Engineering, Resources and Management offers undergraduate degree programs leading to professional practice in forestry and forest engineering. It also offers more broadly defined graduate programs at the master's and doctorate levels in Sustainable Forest Management, including six areas of concentration.

FORESTRY UNDERGRADUATE PROGRAM

The forest management profession requires an understanding of natural resource systems and the management of forest resources for multiple uses. The Bachelor of Science (BS) degree in Forestry provides a broad-based education with the goal of preparing students to be successful forest managers. Graduates must understand biological and physical processes occurring in forests, the social and economic forces that influence policies and actions affecting forests, natural resource systems, and management of forest resources for multiple uses. Students also learn how values affect forest management planning so they can communicate effectively with others and make relevant decisions.

The core curriculum provides a broad-based education which includes basic courses in the biological, physical, social

sciences, as well as professional courses designed to prepare students to manage forest resources. The Forestry BS also requires six months of relevant work experience intended to provide enhanced understanding of the professional workplace. Strength in a specific area is obtained by selecting one of two options and serves to fulfill the 180 credits for graduation:

- **Forest Management**
- **Forest Operations Management**

Graduates are employed by private and public organizations. The private sector includes the timber and forest products industry, forestry consulting firms, environmental organizations, and self-employment. Public employers include federal, state, and local government agencies such as the U.S. Forest Service, Bureau of Land Management, National Park Service, and state departments of forestry and natural resources.

The Bachelor of Science degree in Forestry is accredited by the Society of American Foresters.

FOREST ENGINEERING UNDERGRADUATE PROGRAM

The Forest Engineering Undergraduate Program provides an engineering education within a strong forestry context. The program is founded on fundamental principles in forest science and engineering science. Forest Engineering program objectives are to prepare graduates to plan and implement complex forestry and natural resource operations that help meet global demands for wood products while sustaining water, habitat, and other forest resources. It provides "work ready" graduates for entry into the diverse professional field of forest engineering. Early career accomplishments include harvest unit design, forest road location and design, contract inspection and administration, cost analysis, and forest transportation system design and management. Mid-career accomplishments commonly expand to involve aspects of engineering management, including planning and budgeting, supervision, wood procurement, harvest and road design reviews, and scheduling and controlling forest operations.

Specifically, the Forest Engineering Undergraduate Program provides fundamental coverage of the following:

- Fundamental engineering and forestry principles
- Physical and biological aspects of soil and water resources
- Surveying and measurement of land and forest resources
- Analysis and design of the forest transportation system
- Analysis and design of harvesting operations

- Economics and operational planning principles

Integration of these topics enables forest engineering graduates to develop and manage safe, economical, and environmentally sound forest operations. Design experiences that integrate the topics listed above and steadily build on previous course material are distributed throughout the upper-division portion of the program. The Forest Engineering capstone sequence during the senior year provides an opportunity for students to bring together all the topics from the curriculum in a project framework that includes the field and office engineering tasks associated with the planning and design of forest operations. The capstone sequence is integrated with the Forestry capstone sequence to provide realistic interdisciplinary planning and design experience.

Forest engineering graduates are employed by private forestry firms, public forestry agencies, logging and construction companies, engineering consulting firms, and surveying firms. Some graduates establish their own consulting businesses after a few years of field experience. Career progression following graduation can be quite varied. Some graduates gravitate toward technical positions while others move quickly toward management of harvesting and other forest operations, or more broadly defined management of the forest land base.

The Bachelor of Science degree in Forest Engineering can be earned through completion of the Forest Engineering program or the Forest Engineering-Civil Engineering double degree program. The BS degree in Forest Engineering is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org/>.

The BS in Forest Engineering is also accredited by the Society of American Foresters.

Completion of the five-year, double-degree Forest Engineering-Civil Engineering program results in a BS in Forest Engineering and a BS in Civil Engineering, offered by the School of Civil and Construction Engineering. The BS in Civil Engineering is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org/>.

Forest engineering is a licensed profession in the state of Oregon. The BS in Forest Engineering meets the administrative rules established by the Oregon State Board of Examiners for Engineering and Land Surveying (OSBEELS) as evidence of adequate preparation for the Fundamentals of Engineering Examination, the first of two examinations required for professional engineering licensing. The BS in Forest Engineering, with the completion of appropriate program electives, also

meets the OSBEELS administrative rules for evidence of adequate preparation for the Fundamentals of Land Surveying Examination, the first of two examinations required for professional land surveyor licensing.

UNDERGRADUATE MAJORS WITH OPTIONS

FOREST ENGINEERING (BS, CRED, HBS)

The BS degree in Forest Engineering is offered through a four-year resident curriculum, a four-year and two-term Cooperative Education program, and as part of a five-year double degree program from which graduates receive two bachelor of science degrees, one in forest engineering and one in civil engineering. The BS degree in Forest Engineering is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>. The BS degree in Forest Engineering is also accredited by the Society of American Foresters. The double degree program is offered in cooperation with the School of Civil and Construction Engineering. Curricula for the double degree program is listed under a separate heading. Both programs begin with basic science and mathematics, progress on through engineering science and forest science, to arrive at professional-level courses in forest engineering that include surveying, soil and water resources, timber harvesting, operations analysis, road design, and planning. Graduates are eligible to take the Fundamentals of Engineering Examination.

In addition to the listed courses, all students are required to complete a total of six months of satisfactory employment in an area related to their major. This is usually accomplished by two or more summers of work, but it may include work during the academic year. An optional Cooperative Education program that includes two 6-month internships is available. Students in the Cooperative Education Program satisfy the six months satisfactory employment requirement by virtue of one internship. Work performance and personal conduct are thoroughly appraised by the College of Forestry.

Pre-Professional Forest Engineering Program

Admission to the pre-professional program requires that students be admitted as a degree-seeking undergraduate or post-baccalaureate level student at Oregon State University. Courses included in the first and sophomore years comprise a pre-professional program of study that produces a solid foundation for professional program studies at the junior, senior, and advanced degree levels. The pre-professional program may be taken

at Oregon State University or at any accredited college or university that offers equivalent courses transferable to OSU in conjunction with foundation forestry available via OSU Ecampus.

Professional Forest Engineering Program

Students must be admitted to the professional Forest Engineering program following completion of the pre-professional forest engineering course work in order to progress to the junior year in forest engineering. Students in the double degree program also must be admitted to the College of Engineering professional program following completion of the pre-engineering course work.

Enrollment in professional program courses is restricted to those students who have clearly demonstrated an ability to achieve the standards required for professional studies. The number of students admitted to the program is based on available resources. Students meeting the minimum pre-forest engineering GPA of 2.25 may or may not be admitted depending on available resources.

Admission to the professional program will be granted for students meeting the admission requirements prior to fall term of the junior year. Application for the professional program will be made as of the end of winter term for the following fall term. For admission, students must earn:

1. a grade of "C" or better in all pre-professional courses listed below. Grade repeat (replacement) policy will follow OSU Academic Regulation #20.
2. a minimum GPA of 2.25 based on the pre-professional courses (or transfer equivalents) satisfactorily completed.

Students who have completed their pre-professional studies at a college or university other than Oregon State University must apply both to the OSU Office of Admissions for admission to OSU as a degree-seeking undergraduate or post-baccalaureate level student and to the College of Forestry for admission to the professional program. Application forms for the Forest Engineering professional program and information on policies and programs are available from the College of Forestry.

Students who have not satisfactorily completed all of the pre-professional courses when they apply may be provisionally accepted. Final acceptance is contingent on completion of any remaining pre-professional course work with grade of "C" or better by the end of the summer term prior to entrance into the professional program. Students who receive provisional acceptance and then fail to attain a grade of "C" or better in remaining pre-professional course work prior to the beginning of fall term will be

re-directed to the pre-professional forest engineering program.

All required courses for admission to the professional program must be completed before entering the professional program. Students may only enter the professional program in the fall term each academic year.

The professional program begins with Forestry Field School prior to fall term of the professional program.

Pre-Professional Forest Engineering Program (Major code 825)

Grade standards for the pre-professional program as listed in the program description apply.

First Year (45)

CH 201. Chemistry for Engineering Majors (3)^E

COMM 111. *Public Speaking (3)^{1E}
or COMM 114. *Argument and Critical Discourse (3)^{1E}

ECON 201. *Introduction to Microeconomics (4)^{1E}

FE 101. Introduction to Forest Engineering (2)^E

FE 102. Forest Engineering Problem Solving and Technology (3)^E

FES 141. Tree and Shrub Identification (3)^E

FOR 111. Introduction to Forestry (3)^E

HHS 231. *Lifetime Fitness for Health (2)¹

HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)¹
or any PAC course (1–2)

MTH 251. *Differential Calculus (4)^{1E}

MTH 252. Integral Calculus (4)^E

MTH 254. Vector Calculus I (4)^E

PH 211. *General Physics with Calculus (4)^{1E}

WR 121. *English Composition (3)^{1E}

Free Electives (2)

Sophomore Year (49)

CCE 201. Civil and Construction Engineering Graphics and Design (3)^E

ENGR 211. Statics (3)^E

ENGR 212. Dynamics (3)^E

ENGR 213. Strength of Materials (3)^E

FE 208. Forest Surveying (4)^E

FE 209. Forest Photogrammetry and Remote Sensing (4)^E

FE 257. GIS and Forest Engineering Applications (3)^E

FES 240. *Forest Biology (4)^{1E}

MTH 256. Applied Differential Equations (4)^E

PH 212. *General Physics with Calculus (4)^E

SOIL 205. *Soil Science (4)^{1E}

ST 201. Principles of Statistics (4)^E

WR 327. *Technical Writing (3)^{1E}

*Western Culture Elective (3)

Professional Forest Engineering Program (Major code 380)

Grade standards for the professional program as listed in the program description apply.

All students pursuing the BS in Forest Engineering;

1. must earn grades of “C” or better in all required professional forestry courses (with FE, FOR, FS course designators) or cross listed

course designators, or approved substitutions for majors and options, and;

2. must maintain a 2.0 GPA in all major course work, defined as courses listed by prefix (e.g. FE, FOR, SOIL) and number, and cross listed course designators, and courses used for substitution of required courses.

Junior Year (48)

FE 307. Junior Seminar (1)

FE 310. Forest Route Surveying (4)

FE 312X. Forestry Field School (2)

FE 315. Soil Engineering (4)

FE 316. Soil Mechanics (4)

FE 330. Forest Engineering Fluid Mechanics and Hydraulics (3)

FE 371. Harvesting Process Engineering (4)

FE 434. Forest Watershed Management (4)

FE 440. Forest Operations Analysis (3)

FE 441. Production Planning (3)

FE 470. Logging Mechanics (4)

FE 471. Harvesting Management (3)

FOR 321. Forest Mensuration (5)

FOR 330. Forest Conservation Economics (4)

Senior Year (50)

FE 415. Forest Road Engineering (3)

FE 416. Forest Road System Management (4)

FE 450. ^Forest Operations Design I (4)

[Pending approval **85303**]

FE/FOR 456. *International Forestry (3)¹

FE/FOR 457. Techniques for Forest Resource Analysis (4)

FE 460. ^Forest Operations Regulations and Policy Issues (3)

FE 480. Forest Engineering Practice and Professionalism (1)

FOR 441. Silviculture Principles (4)

FOR 459. Forest Resource Planning and Decision Making (4)

GEO 300. *Sustainability for the Common Good (3)¹

or FW 350. *Endangered Species, Society and Sustainability (3)¹

*Cultural Diversity Elective (3)

*Difference, Power, and Discrimination Elective (3)

*Literature and Arts Elective (3)

Free Electives (8) [Cooperative Education students will be required to complete 4 credits of FE 411, Cooperative Education Mentored Work Experience (1), as a part of their Coop Education; these can be in place of free electives.]

Total=192

Footnotes:

^E Required for entry into the professional program

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

¹ Must be selected to satisfy baccalaureate core requirements.

FOREST ENGINEERING - CIVIL ENGINEERING (BS, CRED, HBS)

The Forest Engineering-Civil Engineering program results in a BS degree in Forest Engineering and a BS degree in Civil Engineering. The BS degree in Forest Engineering is accredited by the Engineering Accreditation Commission

of ABET, (<http://www.abet.org>). The BS degree in Civil Engineering is also accredited by the Engineering Accreditation Commission of ABET, Inc. The BS in Forest Engineering is also accredited by the Society of American Foresters. This unique five-year, double degree program is offered in cooperation with the School of Civil and Construction Engineering. This program begins with basic science and mathematics and progresses on through engineering science and forest science to arrive at professional-level courses in forest engineering that include surveying, soil and water resources, timber harvesting, operations analysis, road design, and planning. Graduates are eligible to take the Fundamentals of Engineering Examination.

In addition to the listed courses, all students are required to complete a total of six months of satisfactory employment in an area related to their major. This is usually accomplished by two or more summers of work, but it may include work during the academic year. An optional Cooperative Education program that includes two 6-month internships is available.

Students in the Cooperative Education program satisfy the six months satisfactory employment requirement by virtue of one internship. Work performance and personal conduct are thoroughly appraised by the College of Forestry.

Admission to the Pre-Professional Forest Engineering-Civil Engineering Program

Admission to the pre-professional program requires that a student be admitted as a degree-seeking undergraduate or post-baccalaureate level student at Oregon State University. Courses included in the first and sophomore years comprise a pre-professional program of study that produces a solid foundation for professional program studies at the junior, senior, and advanced degree levels. The pre-professional program may be taken at Oregon State University or at any accredited college or university that offers equivalent courses transferable to OSU in conjunction with foundation forestry available via OSU Ecampus.

Professional Forest Engineering-Civil Engineering Program

Students must be admitted to the professional forest engineering program following completion of the pre-professional forest engineering course work in order to progress to the junior year in forest engineering. Students in the double degree program must also be admitted to the College of Engineering professional program prior to beginning the civil engineering junior year. Students should consult the College of Engineering for requirements of the College of Engineering professional program.

Enrollment in professional forest engineering program courses is restricted to those students who have clearly demonstrated an ability to achieve the standards required for professional studies. The number of students admitted to the program is based on available resources. Students meeting the minimum pre-forest engineering GPA of 2.25 may or may not be admitted depending on available resources.

Admission to the professional forest engineering program will be granted for students meeting the admission requirements prior to fall term of the junior year. Application for the professional program will be made as of the end of winter term for the following fall term. For admission, students must earn:

1. a grade of "C" or better in all pre-professional courses listed below. Grade repeat (replacement) policy will follow OSU Academic Regulation #20.
2. a minimum GPA of 2.25 based on the pre-professional courses (or transfer equivalents) satisfactorily completed.

Students who have completed their pre-professional studies at a college or university other than Oregon State University must apply both to the OSU Office of Admissions for admission to OSU as a degree-seeking undergraduate or post-baccalaureate level student and to the College of Forestry for admission to the professional program. Application forms for the forest engineering professional program and information on policies and programs are available from the College of Forestry.

Students who have not satisfactorily completed all of the pre-professional courses when they apply may be provisionally accepted. Final acceptance is contingent on completion of any remaining pre-professional course work with grade of "C" or better by the end of the summer term prior to entrance into the professional program. Students who receive provisional acceptance and then fail to attain a grade of "C" or better in remaining pre-professional course work prior to the beginning of fall term will be re-directed to the pre-professional forestry program.

All required courses for admission to the professional program must be completed before entering the professional program. Students may only enter the professional program in the fall term of each academic year.

The professional forest engineering program begins with Forestry Field School prior to fall term of the professional program.

Pre-Professional Forest Engineering-Civil Engineering Program (Major code 825)

Grade standards for the pre-professional

program as listed in the program description apply.

First Year (46)

CCE 101. Civil and Construction Engineering Orientation (2)^{E++}
 CH 201. Chemistry for Engineering Majors (3)^{E+}
 CH 202. Chemistry for Engineering Majors (3)^{E++}
 CH 205. Laboratory for CH 202 (1)^{E++}
 COMM 111. *Public Speaking (3)^{E+} or COMM 114. *Argument and Critical Discourse (3)^{E+}
 ECON 201. *Introduction to Microeconomics (4)^E
 FE 101. Introduction to Forest Engineering (2)^E
 FE 102. Forest Engineering Problem Solving and Technology (3)^{E+}
 FES 141. Tree and Shrub Identification (3)^E
 HHS 231. *Lifetime Fitness for Health (2)^E
 HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)^E or any PAC course (1–2)
 MTH 251. *Differential Calculus (4)^{E+}
 MTH 252. Integral Calculus (4)^{E+}
 MTH 254. Vector Calculus I (4)^{E+}
 PH 211. *General Physics with Calculus (4)^{E+}
 WR 121. *English Composition (3)^{E+}

Sophomore Year (50)

CCE 201. Civil and Construction Engineering Graphics and Design (3)^E
 ENGR 211. Statics (3)^{E+}
 ENGR 212. Dynamics (3)^{E++}
 ENGR 213. Strength of Materials (3)^{E+}
 FE 208. Forest Surveying (4)^E
 FE 209. Forest Photogrammetry and Remote Sensing (4)^E
 FE 257. GIS and Forest Engineering Applications (3)^{E++}
 FES 240. *Forest Biology (4)^{E++}
 MTH 256. Applied Differential Equations (4)^{E+}
 MTH 306. Matrix and Power Series Methods (4)^{E+}
 PH 212, PH 213. *General Physics with Calculus (4, 4)^{E+}
 SOIL 205. *Soil Science (4)^E
 ST 314. Introduction to Statistics for Engineers (3)^{E++}

Professional Forest Engineering-Civil Engineering Program (Major code 380)

Grade standards for the professional program as listed in the program description apply.

All students pursuing the BS in Forest Engineering-Civil Engineering:

1. must earn grades of "C" or better in all required professional forestry courses (with FE, FOR, FS, course designators), or cross listed course designators, or approved substitutions for majors and options, and;
2. must maintain a 2.0 GPA in all major course work, defined as courses listed by prefix (e.g. FE, FOR, SOIL) and number, and cross listed course designators, and courses used for substitution of required courses.

Forest Engineering Junior Year (49)

FE 307. Junior Seminar (1)
 FE 310. Forest Route Surveying (4)
 FE 312X. Forestry Field School (2)
 FE 315. Soil Engineering (4)
 FE 316. Soil Mechanics (4)
 FE 371. Harvesting Process Engineering (4)
 FE 434. Forest Watershed Management (4)
 FE 440. Forest Operations Analysis (3)
 FE 441. Production Planning (3)
 FE 470. Logging Mechanics (4)
 FOR 321. Forest Mensuration (5)
 FOR 330. Forest Conservation Economics (4)
 FOR 441. Silviculture Principles (4)
 GEO 300. *Sustainability for the Common Good (3)¹ or FW 350. *Endangered Species, Society and Sustainability (3)¹

Civil Engineering Junior Year (48)

CCE 321. Civil Engineering Materials (4)
 CE 311. Fluid Mechanics (4)
 CE 313. Hydraulic Engineering (4)
 CE 361. Surveying Theory (4)
 CE 381, CE 382. Structural Theory I, II (4, 4)
 CE 383. Design of Steel Structures (4)
 CE 392. Introduction to Highway Engineering (4)
 ENGR 201. Electrical Fundamentals I (3)⁺⁺
 ENVE 321. Environmental Engineering Fundamentals (4)
 WR 327. *Technical Writing (3)
 *Cultural Diversity Elective (3)
 *Literature and Arts Elective (3)

Senior Year (49)

CE Design elective (3)
 CE 418. ^Civil Engineering Professional Practice (3)
 CE 419. Civil Infrastructure Design (4)
 CE 481. Reinforced Concrete I (4)
 CE 491. Transportation Engineering (3)
 FE 415. Forest Road Engineering (3)
 FE 416. Forest Road System Management (4)
 FE 450. ^Forest Operations Design I (3) [Credits increase to 4 in summer 2015 upon approval of **85303**]
 FE 456/FOR 456. *International Forestry (3)
 FE 457/FOR 457. Techniques for Forest Resource Analysis (4)
 FE 459/FOR 459. Forest Planning and Decision Making (4)[Pending approval **85292**]
 FE 460. ^Forest Operations Regulations and Policy Issues (3)
 FE 480. Forest Engineering Practice and Professionalism (1)
 *Western Culture Elective (3)
 *Difference, Power, and Diversity Elective (3)

Total = 242

Footnotes:

- * Baccalaureate Core Courses
- ^ Writing Intensive Course
- + Required courses for pre-civil engineering program
- ++ Additional Recommended courses for pre-civil engineering program
- ^E Required for entry into the Forest Engineering professional program.
- ¹ Must be selected to satisfy baccalaureate core requirements.

FORESTRY (BS, HBS)

The successful forester must understand the biological and physical processes of forest ecosystems, as well as the social, economic, and operational forces that influence forest policies and management actions. The forestry core curriculum includes basic courses in the biological, physical, social sciences, and six months of work experience as well as professional courses designed to prepare students to manage forest resources.

Strength in a specific area is obtained by selecting one of the following options:

- Forest Management
 - Forest Operations Management
- The Bachelor of Science degree in Forestry is accredited by the Society of American Foresters (SAF).

In addition to the listed courses, all students are required to complete a total of six months of satisfactory employment in an area related to their major. This is usually accomplished by two or more summers of work, but it may include work during the academic year. An optional Cooperative Education program that includes two 6-month internships is available. Students in the Cooperative Education Program satisfy the six months satisfactory employment requirement by virtue of one internship. Work performance and personal conduct are thoroughly appraised by the College of Forestry.

Six months of forestry or related natural resource work experience and completion of an option is required in the forestry degree program. The option courses compliment the forestry core and serve to fulfill the 180 credits for graduation.

Pre-Professional Forestry Program

Admission to the pre-professional program requires that a student be admitted as a degree-seeking undergraduate or post-baccalaureate level student at Oregon State University. Courses included in the first and sophomore years comprise a pre-professional program of study that produces a solid foundation for professional program studies at the junior, senior, and advanced degree levels. The pre-professional program may be taken at Oregon State University or at any accredited college or university that offers equivalent courses transferable to OSU in conjunction with foundation forestry available via OSU Ecampus.

Professional Forestry Program

Successful completion of the pre-professional program will result in acceptance into the professional program. This requires selection of an option and:

1. a grade of "C" or better in all pre-professional courses listed below. Grade repeat (replacement) policy will follow OSU Academic Regulation 20.

2. a minimum GPA of 2.25 based on the pre-professional courses (or transfer equivalents) satisfactorily completed.

Admission to the professional program will be granted for students meeting the admission requirements prior to fall term of the junior year. Application for the professional program will be made as of the end of winter term for the following fall term.

Enrollment in professional program courses is restricted to those students who have clearly demonstrated an ability to achieve the standards required for professional studies. The number of students admitted to the program is determined based on available resources. Students meeting the minimum Pre-Forestry GPA of 2.25 may or may not be admitted depending on available resources.

Students who have completed their pre-professional studies at a college or university other than Oregon State University must apply both to the OSU Office of Admissions for admission to OSU as a degree-seeking undergraduate or post-baccalaureate level student and to the College of Forestry for admission to the professional program. Application forms and information on policies and programs are available from the College of Forestry.

Students who have not satisfactorily completed all of the pre-professional courses when they apply may be provisionally accepted. Final acceptance is contingent on completion of any remaining pre-professional coursework with grade of "C" or better by the end of the summer term prior to entrance into the professional program. Students who receive provisional acceptance and then fail to attain "C" or better grades in any remaining pre-professional course work prior to the beginning of fall term will be re-directed to the pre-professional forestry program.

All courses required for admission to the professional program must be completed before entering the professional program. Students may only enter the professional program for fall term each academic year.

The professional program begins with Forestry Field School during the two weeks prior to the first fall term of the professional program.

Pre-Professional Forestry (Major code 810)

Grade standards for the pre-professional program as listed in the program description apply.

First Year (45)

- AREC 250. * Introduction to Environmental Economics and Policy (3)
or ECON 201. *Introduction to Microeconomics (4)
BI 212. *Principles of Biology (4)
CH 231. *General Chemistry (4)

- CH 261. *Laboratory for Chemistry 231 (1)
COMM 111. *Public Speaking (3)
or COMM 114. *Argument and Critical Discourse (3)
FES 241. Dendrology (5)
FOR 111. Introduction to Forestry (3)
or NR 201. Managing Natural Resources for the Future (3)
FOR 112. Computing Applications in Forestry (3)
HHS 231. *Lifetime Fitness for Health (2)
HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)
or any PAC course (1–2)
MTH 111. *College Algebra (4)
MTH 112. *Elementary Functions (4)
MTH 241. *Calculus for Management and Social Science (4)
WR 121. *English Composition (3)

Sophomore Year (45–47)

- FE 208. Forest Surveying (4)
FE 209. Forest Photogrammetry and Remote Sensing (4)
FE 257. GIS and Forest Engineering Applications (3)
FES 240. *Forest Biology (4)
PH 201. *General Physics (5)
SOIL 205. *Soil Science (4)
ST 201. Principles of Statistics (4)
WR 327. *Technical Writing
or WR 362. *Science Writing (3)
Option Courses and/or Bacc Core Courses (14–16)

Professional Forestry (Major code 820)

All students pursuing the BS in Forestry;

1. must earn grades of "C" or better in all required professional forestry courses (with FE, FOR, FS course designators), or crosslisted course designators, or approved substitutions for majors and options, and;
2. must maintain a 2.0 GPA in all major course work, defined as courses listed by prefix (e.g. FOR, BA, BOT) and number, or used for substitution of required courses, and as part of option lists.

Junior Year (47)

- FE/FOR 312X. Forestry Field School (2)
FE 370. Harvesting Operations (4)
FE 434. Forest Watershed Management (4)
FOR/FE 307. Junior Seminar (1)
FOR 321. Forest Mensuration (5)
FOR 330. Forest Conservation Economics (4)
FOR 331. Forest Resource Economics II (4)
FOR 429. Integrated Prescriptions (3)
FOR 443. Silvicultural Practices (5)
Option Courses and/or Bacc Core Courses (16)

Senior Year (41–43)

- FE 450. Forest Operations Design I (4)
FE/FOR 457. Techniques for Forest Resource Analysis (4)
FE/FOR 459. Forest Resource Planning and Decision Making (4)[Pending approval, #85292]
FOR/FE 456. *International Forestry (3)
[or other CGI Bacc Core course]
FOR 460. ^Forest Policy (4)

or FE 460. ^Forest Operations Regulations and Policy Issues (3)
Option Courses and/or Bacc Core Courses (22–24)

Total=180

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

OPTIONS

FOREST MANAGEMENT OPTION

Pre-Professional Forestry

Grade standards for the pre-professional program as listed in the program description apply.

Sophomore Year (14)

FES 251. Recreation Resource Management (4)

Bacc Core Electives (9)

Free Elective (1)

Professional Forestry

Grade standards for the professional program as listed above apply.

Junior Year (16)

FES 341. Forest Ecology (3)

FES 355. Management for Multiple Resource Values (4)

FOR 322. Forest Models (3)

FW 453. Forest Management and Wildlife Conservation (3)

Bacc Core Elective (3)

Senior Year (24)

BOT/FES 415. Forest Insect and Disease Management (5)

FE/FOR 456. *International Forestry (3)

Select at least 16 credits from the following list:

FES 360. Collaboration and Conflict Management (3)

FES/FW 445. Ecological Restoration (4)

FES 454. Managing at the Wildland-Urban Interface (3)

FOR 346. Topics in Wildland Fire (3)

FOR 411. Cooperative Education

Mentored Work Experience (1)

FOR 421. Spatial Analysis of Forested Landscapes (3)

FOR 436. Wildland Fire Science and Management (4)

FOR 442. Silviculture Reforestation (4)

FOR 446. Wildland Fire Ecology (3)

FOR 462. Natural Resource Policy and Law (3)

FOREST OPERATIONS MANAGEMENT OPTION

The Forest Operations Management option requires the completion of 7 business courses that can be taken as a minor if the student gains entrance to the College of Business Entrepreneurship minor.

Pre-Professional Forestry

Grade standards for the pre-professional program as listed in the program description apply.

Sophomore Year (16)

BA 211. Financial Accounting (4)

BA 213. Managerial Accounting (4)

BA 230. Business Law I (4)

BA 260. Introduction to Entrepreneurship (4)

Professional Forestry

Grade standards for the professional program as listed above apply.

Junior Year (16)

BA 390. Marketing (4)

FE 440. Forest Operations Analysis (3)

FE 441. Production Planning (3)

Bacc Core Elective (6)

Senior Year (25)

BA 351. Managing Organizations (4)

BA 460. Venture Management (4)

FE 471. Harvesting Management (3)

Bacc Core Electives (12)

Free Electives (2)

UNDERGRADUATE MINORS

FORESTRY MINOR

The Forestry minor provides basic knowledge about management of forest resources. (This minor is not available for students in forest engineering.)

Two classes from the core may be used for both the major requirements and the minor. All additional courses in the minor must be in addition to courses being used to satisfy the requirements of the major.

Core

FES 141. Tree and Shrub Identification (3)

FES 240. *Forest Biology (4)

FOR 111. Introduction to Forestry (3)

FOR 330. Forest Conservation Economics (4)

FOR 441. Silviculture Principles (4)

Select a minimum of 10 credits from:

FES/BOT 415. Forest Insect and Disease Management (5)

FE 370. Harvesting Operations (3)

FE 434. Forest Watershed Management (4)

FE/FOR 456. *International Forestry (3)

FE 460. ^Forest Operations Regulations and Policy Issues (3)

FES 251. Recreation Resource Management (4)

FES 355. Management for Multiple Resource Values (3)

FOR 321. Forest Mensuration (5)

FOR 331. Forest Resource Economics II (4)

FOR 457. Techniques for Forest Resource Analysis (4)

FOR 460. ^Forest Policy (4)

FOR 462. Natural Resource Policy and Law (3)

FW 453. Forest Management and Wildlife Conservation (3)

Total=28

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

GRADUATE MAJORS

SUSTAINABLE FOREST MANAGEMENT (MF, MS, PhD, MAIS)

Graduate Areas of Concentration

Engineering for sustainable forestry; forest biometrics and geomatics; forest operations planning and management; forest policy analysis and management; forest watershed management; silviculture, fire, and forest health

The Sustainable Forest Management (SFM) graduate program emphasizes the conservation of forest-dominated landscapes to meet a defined set of ecological, economic and social criteria over long time frames. The program follows the sustainable principles outlined by the Montreal Process Criteria and Indicators. These principles have been adopted by the state of Oregon.

The program provides a strong grounding in the principles and techniques of active management of forests to improve forest health and condition while producing a full range of products and ecosystem services. It consists of a common core in the principles and criteria of sustainable forest management; statistics for design and interpretation of experiments; and specialization in one of six areas of concentration. The MF degree requires a project, MS a thesis, and PhD a dissertation.

**Areas of Concentration
Engineering for Sustainable Forestry**

Designing forest operations to achieve sustainable forest management objectives; ecological restoration operations; road design and construction. Supporting course work often draws from forest transportation systems, forest hydrology, forest geomatics, forest road engineering, forest road management, water quality and forest land use, forest operations analysis, production planning, strategic and tactical planning, harvest design, forest operations regulations and policy issues, advanced logging mechanics, harvesting management, wildland fire ecology, forest policy analysis, advanced silviculture, forest wildlife habitat management, remote sensing, advanced GIS applications in forestry, forest erosion processes, mathematical programming, heuristics for combinatorial optimization, economics of the forest resource, human resources management, and human factors engineering. Contacts: P. Adams, Boston, Chung, Leshchinsky, Segura, Sessions, Skaugset

Forest Biometrics and Geomatics

Modeling tree and stand development; forest data sampling and monitoring methods; forest measurements and assessments; mapping and data management technologies. Supporting course work often draws from forest biometrics, forest geomatics, forest models, statisti-

cal methods, advanced aerial photos and remote sensing, advanced GIS applications in forestry, forest policy analysis, advanced silviculture, digital image processing, advanced GIS applications in the geosciences, photogrammetry, aerial and terrestrial LiDAR applications. **Contacts:** Hailemariam, Hilker, Maguire, Wing

Forest Operations Planning and Management—Planning, organizing, and executing forest plans; enhancing supply chain efficiency and improving international competitiveness. Supporting course work often draws from tactical and operational planning, forestry supply chain management, forest geomatics, production planning, forest transportation systems, forest operations regulations and policy analysis, heuristics for combinatorial optimization, mathematical programming, advanced GIS applications in forestry, economics of the forestry resource, forest wildlife habitat management, industrial systems optimization, statistical methods, forest products marketing, forest biometrics, forest modeling, lean systems manufacturing, advanced production planning and control, human resources management, and organizational management. **Contacts:** Boston, Chung, Kellogg, Sessions

Forest Policy Analysis and Management—Analyzing tradeoffs in the forest and resource policy decision process; public land use policy; interpretations of regulations; markets for forest products; forest certification; theoretical and applied research related to ecosystem services. Supporting course work often draws from natural resource policy and law, economics of the forest resource, spatial analysis of forested landscapes, economic theory, applied econometrics, environmental economics, markets and prices in the forest sector, valuation of non-market resources, analytic techniques for forest managers, mathematical programming, heuristics for combinatorial optimization; and work in other fields to support thesis or dissertation research. This area of concentration is jointly sponsored by FERM, the Applied Economics Graduate Program and the Applied Economics Department.

Contacts: Latta, Maness, Montgomery, White

Forest Watershed Management—Understanding watershed conditions and processes in forested ecosystems and the effects of management activities; evaluating and improving soil and water quality and related practices and policies for forest operations. Supporting course work often draws from forest hydrology, stream ecology, mineral-organic matter interactions, physics of soil ecosystems, biology of soil ecosystems, geochemistry of soil

ecosystems, soil morphology and classification, limnology, water quality and forest land use, forest erosion processes, hillslope and watershed hydrology, forest transportation systems, forest operations regulations and policy issues, harvesting management, forest policy analysis, physiology of woody plants, design and analysis of experiments, statistical methods, riparian ecology and management, groundwater hydraulics, groundwater modeling, sediment transport, water quality dynamics, principles of stable isotopes, advanced chemical processes in soil systems, advanced soil biology and biochemistry, advanced soil genesis and classification. **Contacts:** P. Adams, Bladon, Hatten, Segura, Skaugset

Silviculture, Fire, and Forest Health—Manipulating vegetation to achieve management objectives, from restoration to intensive timber production; fire ecology and fire management; forest ecosystem health. Supporting course work often draws from advanced silviculture, advanced GIS applications in forestry, forest biometrics, forest modeling, economics of the forest resource, wildland fire science and management, ecological restoration, forest policy analysis, statistical methods, sampling methods, forest hydrology, watershed quality and forest land use, forest insect and disease management, natural resource data analysis, advanced forest community ecology, wildland fire ecology, biology of invasive plants, forest wildlife habitat management, physiology of woody plants, global change ecology, ecosystem analysis and application, weed management, and wildlife ecology. **Contacts:** Bailey, Fitzgerald, Maguire, Powers, Rose, Shaw

Students choose their specialization during their first year of study. Programs are often interdisciplinary, drawing from a wide range of departments on campus. Incoming students without a prior degree in forestry management are usually required to undertake an additional set of forestry core courses.

The Department of Forest Engineering, Resources and Management at Oregon State University is internationally known for its excellent teaching, research and Extension faculty and programs, including the 11,500 acre McDonald/Dunn Research Forest within a few minutes drive from campus. Emphasis is on Pacific Northwest conditions, but graduates are actively serving in many regions of the world. The department maintains close ties with industry, appropriate government agencies, and academic centers nationally and internationally. More detailed information, including sample curricula, can be found in the graduate advising guide on our website at <http://ferm.forestry.oregonstate.edu/sites/ferm>.

forestry.oregonstate.edu/files/Grad%20SFM%20Advising%20Guide%20December2013.pdf.

■ FOREST ENGINEERING COURSES

FE 101. INTRODUCTION TO FOREST ENGINEERING (2). Introduction to the forest engineering discipline. Discussion of critical issues, available resources, career opportunities and professional opportunities. Overview of field instruments and analytical approaches.

FE 102. FOREST ENGINEERING PROBLEM SOLVING AND TECHNOLOGY (3). A technology applications course designed to introduce students to formulating and implementing computational solutions to engineering analysis and design problems in a digital environment. Students will learn to evaluate engineering problems, formulate one or more solution techniques or algorithms, and code the solution using spreadsheet and/or programming software. Professionalism in completing and presenting laboratory exercises is emphasized. Laboratory examples draw from a variety of engineering topics. This course may be substituted for CE 102, Civil Engineering I: Problem Solving and Technology. **PREREQS:** Calculus

FE 208. FOREST SURVEYING (4). Introduction to theory and practice of surveying methods and measurements as applied to the specifics of forestry problems and their solutions. This is the first of a four-course sequence (FE 208, 209, 310, 311). Together with FE 257 it is designed to prepare students for the Fundamentals of Land Surveying exam, which is necessary to become a professional land surveyor. **PREREQS:** (MTH 112 or MTH 241 or MTH 251 or MTH 252) and (FOR 111 or NR 201)

FE 209. FOREST PHOTOGRAMMETRY AND REMOTE SENSING (4). Management and conservation of natural resources with the fundamentals of spatial data acquisition from airborne and spaceborne sensors. Introduction to theory of spectral reflectance properties of vegetation, the principles of photographic analysis and aerial photo-interpretation and new advances such as LIDAR. **PREREQS:** MTH 112 or MTH 241 or MTH 251 or MTH 251H or MTH 252 or MTH 252H

FE 257. GIS AND FOREST ENGINEERING APPLICATIONS (3). An introduction to the appropriate use and potential applications of geographic information systems (GIS) and related technologies (GPS and remote sensing) in forest management and operational planning and problem solving. Students are presented with lectures and exercises that cover a wide range of GIS and GIS-related topics and issues including spatial database creation, structure, analysis, and modeling.

FE 307. JUNIOR SEMINAR (1). College is the time to develop the skills necessary for the transition between academics and career. In conjunction with the expertise already available on campus, this course will guide students through career planning, exploration, placement, and employer expectations. **CROSSLISTED** as FOR 307. **PREREQS:** Professional forestry students only.

FE 310. FOREST ROUTE SURVEYING (4). Route surveying and site surveying applied to forestry problems. Use of surveying equipment; traversing; computations; leveling; horizontal, vertical, compound, reverse and spiral curves; earthwork; construction staking as applied to new road and existing road P-line survey. Includes rapid survey techniques. Lec/lab. **PREREQS:** (FE 308 and FE 309)

FE 312X. FORESTRY FIELD SCHOOL (2). A hands-on experience in the major aspects of forestry, including regeneration surveys, silviculture, cruising, recreation, forest

disturbances, logging site and mill visits, east and west of the Cascades Range. **CROSSLISTED** as FOR 312X. **PREREQS:** Admission into a professional school in the Forestry, Forest Engineering, or Forest Engineering/Civil Engineering program.

FE 315. SOIL ENGINEERING (4). Use of soil in engineering and construction. Identification and classification. Engineering properties of soil: permeability, compressibility, and strength. Compaction principles and methods. Field control of soil engineering projects. **PREREQS:** ENGR 213* and CE 311 or CEM 311 or FE 330

FE 316. SOIL MECHANICS (4). Soil strength and soil mechanics theories applied to analysis of slope stability, retaining structures, foundations, and pavements. Lec/lab. **PREREQS:** (FE 315* or CE 372*)

FE 330. FOREST ENGINEERING FLUID MECHANICS AND HYDRAULICS (3). Fluid properties, pressure, fluid statics, continuity, energy equation, single and series pipe flow, open channel hydraulics, peakflow estimates for culvert design, stream crossing design. Lec/lab. **PREREQS:** (ENGR 213* and FE 102*)

FE 370. HARVESTING OPERATIONS (4). Timber harvesting and transport methods from the forest to the mill. Technical feasibility, economic, and environmental relationships in forestry operations. **PREREQS:** Junior standing in forestry. For non-forest engineering students.

FE 371. HARVESTING PROCESS ENGINEERING (4). Timber harvesting equipment and systems. Harvesting process evaluation and decisions aided by forest engineering analysis. **PREREQS:** ENGR 211 and FE 102. **COREQS:** FE 308 and FE 357

FE 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits.

FE 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

FE 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

FE 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

FE 411. COOPERATIVE EDUCATION MENTORED WORK EXPERIENCE (1). College is the time to develop the skills necessary for the transition between academics and career. Cooperative Education Mentored Work Experience is a graded field experience in which the student protegee will apply academic study in a "real world" career setting. **CROSSLISTED** as FOR 411. This course is repeatable for a maximum of 4 credits. **PREREQS:** Professional forestry students only.

FE 415. FOREST ROAD ENGINEERING (3). Location, surveying, design, cost estimation, and construction practices for forest roads. Lecture on principles, and laboratory field practice in locating, surveying, designing, and cost estimating. **PREREQS:** FE 310

FE 416. FOREST ROAD SYSTEM MANAGEMENT (4). Structural characteristics of bridges, load rating, structural design of culverts, aggregate testing and evaluation, environmental assessment of forest road systems, road maintenance cycles and management. **PREREQS:** ((ENGR 211 or ENGR 211H) and ENGR 213 and FE 316 and FE 415)

FE 422. FOREST GEOMATICS (4). Topics include digital techniques for geospatial database creation, computer programming techniques for database manipulation and analysis, and applications of geospatial data for natural resource measurement and analysis. Class meetings include lectures and applied spatial analysis laboratory assignments. A final term project must be designed, conducted, and presented. Lec/lab. **PREREQS:** (CE 202 or FE 357 or GEO 365 or (GEO 465 or GEO 565))

FE 430. WATERSHED PROCESSES (4). Effects of land use practices on the physical hydrology (interception, infiltration, evapotranspiration, subsurface flow and surface runoff, water yields, and peak flows) of forested watersheds. Surface erosion, mass soil movements, stream temperatures, nutrient levels and effects of management activities upon riparian systems; forest practice rules. Lec/lab. **PREREQS:** Junior standing.

FE 434. FOREST WATERSHED MANAGEMENT (4). Physical hydrology, erosion processes, streams, and riparian areas of forested ecosystems. The material can be widely applied, but is applicable primarily to the humid, temperate rainforests of the Pacific Northwest. **PREREQS:** (CH 121 or CH 201 or CH 231) and (SOIL 205 or CSS 305 or CSS 205) and (MTH 241 or MTH 251 or MTH 251H)

FE 435. FOREST WATERSHED MANAGEMENT IMPACTS (3). Impacts of forest disturbance, timber harvest, wildfire, insect outbreaks, and low frequency storms and floods on watershed hydrology and streams. **PREREQS:** FE 434 and / or equivalent

FE 440. FOREST OPERATIONS ANALYSIS (3). Identification and measurement of production components in harvesting systems. Methods analysis, productivity improvement and engineering economics. Report writing skills emphasized. Lec/lab. **PREREQS:** (FE 102 and (FE 370 or FE 371)) and basic statistics

FE 441. PRODUCTION PLANNING (3). Resource planning using critical path analysis, tactical approaches and regulations. Business planning including bidding, budgeting, scheduling, equipment replacement analysis, and fleet maintenance. **PREREQS:** FE 440 and senior standing

FE 447. TACTICAL AND OPERATIONAL PLANNING TECHNIQUES (3). Use of linear, mixed integer, heuristic methods, and simulation to solve forest operations management problems with emphasis on harvest scheduling, transportation planning, crew, and truck scheduling. Lec/lab. **PREREQS:** (FOR 330 and FE 371) and /or equivalent or instructor approval.

FE 448. ^FOREST OPERATIONS PLANNING AND SCHEDULING (3). Development of operational forest management plans. Evaluate logistical options. Develop budgets, crew, and contractors' schedules. Lec/rec. (Writing Intensive Course) **PREREQS:** (FE 449 and FOR 331)

FE 449. STRATEGIC AND TACTICAL PLANNING TECHNIQUES (3). Use of linear, mixed integer, heuristic methods, and simulations to solve complex forest management problems with emphasis on intertemporal multiple use scheduling, spatial analysis, and transportation planning. Lec/lab. **PREREQS:** FOR 330 and FOR 441 or equivalent or instructor approval

FE 450. ^FOREST OPERATIONS DESIGN I (3). Timber harvest planning. Establishing goals, data collection, identifying values and limitations, establishing plan expectations, identifying feasible harvesting systems and making assessments applying technical, economic, and social conditions. (Writing Intensive Course) **PREREQS:** (FE 434 and FE 470)

FE 451. ^FOREST OPERATIONS DESIGN II (3). Timber harvest planning. Evaluation of alternative harvest system choices, formulating and scheduling harvest units to meet goals and objectives, communicating and implementing harvest plans, monitoring plans and communicating long term results. (Writing Intensive Course) **PREREQS:** FE 450

FE 456. *INTERNATIONAL FORESTRY (3). An introduction to the biological, physical, and sociological factors that shape the world's forests and the activities used to manage those forests. What influence these factors have on forest policies, practices, and outcomes. **CROSSLISTED**

as FOR 456. (Bacc Core Course) **PREREQS:** Introductory course in biology.

FE 457. TECHNIQUES FOR FOREST RESOURCE ANALYSIS (4). Use of linear programming, nonlinear programming, dynamic programming, and simulation to solve complex forest management problems, with emphasis on intertemporal multiple-use scheduling. Forestry transportation problems, multiple-use allocation, and investment analysis. Filed trips required. **CROSSLISTED** as FOR 457/FE 557. **PREREQS:** AREC 351 or FOR 330

FE 460. ^FOREST OPERATIONS REGULATIONS AND POLICY ISSUES (3). Reviews regulations and other policies that affect timber harvesting and other forest practices, particularly policies that address concerns of environment, safety, employment and transportation. Discusses how such rules and other policies evolve, including the role of public perceptions, forestry professionals and other key policy players. (Writing Intensive Course) **PREREQS:** Senior standing.

FE 470. LOGGING MECHANICS (4). Relationship of torque, power, and thrust to the operation of cable and ground-based harvesting systems. On-highway and off-highway heavy truck performance. **PREREQS:** (ENGR 211 or ENGR 211H) and ENGR 213 and FE 371)

FE 471. HARVESTING MANAGEMENT (3). Verification of harvesting assessment plans and operational planning/field layout. Practical logging skills related to harvest planning, operations monitoring, and designing worker training programs. Lec/lab. **PREREQS:** (FE 371 and FE 470)

FE 480. FOREST ENGINEERING PRACTICE AND PROFESSIONALISM (1). Personal and professional skills, attributes, and issues in forest engineering practice. Includes topics such as ethics, land stewardship, media relations and risk management. **PREREQS:** Senior standing.

FE 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 8 credits.

FE 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

FE 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

FE 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

FE 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

FE 507. SEMINAR (1-16). Subject matter as required by graduate programs. This course is repeatable for a maximum of 16 credits.

FE 515. FOREST ROAD ENGINEERING (3). Location, surveying, design, cost estimation, and construction practices for forest roads. Lecture on principles, and laboratory field practice in locating, surveying, designing, and cost estimating. **PREREQS:** Basic surveying and permission of instructor.

FE 516. FOREST ROAD SYSTEM MANAGEMENT (4). Structural characteristics of bridges, load rating, structural design of culverts, aggregate testing and evaluation, environmental assessment of forest road systems, road maintenance cycles and management. **PREREQS:** FE 415 or FE 515

FE 522. FOREST GEOMATICS (4). Topics include digital techniques for geospatial database creation, computer programming techniques for database manipulation and analysis, and applications of geospatial data for natural resource measurement and analysis. Class meetings include lectures and applied spatial analysis laboratory assignments. A final term project must be designed, conducted, and presented. Lec/lab. **PREREQS:** CE 202 or FE 357 or GEO 365 or

(GEO 465 or GEO 565)

FE 530. WATERSHED PROCESSES (4). Effects of land use practices on the physical hydrology (interception, infiltration, evapotranspiration, subsurface flow and surface runoff, water yields, and peak flows) of forested watersheds. Surface erosion, mass soil movements, stream temperatures, nutrient levels and effects of management activities upon riparian systems; forest practice rules. Lec/lab. **PREREQS:** Junior standing.

FE 532. FOREST HYDROLOGY (4). Physical hydrology, erosion processes, and attributes of stream ecosystems for forested watersheds. Material can be widely applied, but is applicable primarily to the humid, temperate rainforests of the Pacific Northwest. Lec/rec. **PREREQS:** BEE 512 or equivalent Intro to Hydrology course.

FE 535. WATER QUALITY AND FOREST LAND USE (3). Influence of natural and land-use factors on water quality; monitoring strategies and analytical methods; municipal watershed management. **PREREQS:** FE 430 or FE 530

FE 536. WATERSHED IMPACTS OF FOREST DISTURBANCE (4). Impacts of forest disturbances that include timber harvest; wildfire; insect outbreaks; and large, low frequency storms and floods on the watershed hydrology, erosion processes, and stream ecosystems of forested watersheds. Lec/rec. **PREREQS:** FE 532

FE 537. HILLSLOPE AND WATERSHED HYDROLOGY (4). Advanced course on hillslope hydrology covering the physical, chemical and isotopic nature of runoff generation from the pore scale to the catchment scale.

FE 540. FOREST OPERATIONS ANALYSIS (3). Identification and measurement of production components in harvesting systems. Methods analysis, productivity improvement and engineering economics. Report writing skills emphasized. Lec/lab. **PREREQS:** FE 102 and (FE 370 or FE 371) and basic statistics.

FE 541. PRODUCTION PLANNING (3). Resource planning using critical path analysis, tactical approaches and regulations. Business planning including bidding, budgeting, scheduling, equipment replacement analysis, and fleet maintenance. **PREREQS:** (FE 440 or FE 540) and senior standing

FE 547. TACTICAL AND OPERATIONAL PLANNING TECHNIQUES (3). Use of linear, mixed integer, heuristic methods, and simulation to solve forest operations management problems with emphasis on harvest scheduling, transportation planning, crew, and truck scheduling. Lec/lab. **PREREQS:** FOR 330 and FE 371 or equivalent or instructor approval.

FE 549. STRATEGIC AND TACTICAL PLANNING TECHNIQUES (3). Use of linear, mixed integer, heuristic methods, and simulations to solve complex forest management problems with emphasis on intertemporal multiple use scheduling, spatial analysis, and transportation planning. Lec/lab. **PREREQS:** FOR 441 or equivalent or instructor approval. **COREQS:** FOR 330.

FE 550. FOREST OPERATIONS DESIGN I (3). Timber harvest planning. Establishing goals, data collection, identifying values and limitations, establishing plan expectations, identifying feasible harvesting systems and making assessments applying technical, economic, and social conditions. **PREREQS:** FE 434 and FE 470

FE 551. FOREST OPERATIONS DESIGN II (3). Timber harvest planning. Evaluation of alternative harvest system choices, formulating and scheduling harvest units to meet goals and objectives, communicating and implementing harvest plans, monitoring plans and communicating long term results. **PREREQS:** FE 450 or FE 550

FE 552. FOREST TRANSPORTATION SYSTEMS (4). Analysis of interactions between harvesting and road systems. Advanced topics in road and landing spacing, determination of road standards, analysis of logging road networks, transfer and sort yard facility location. Simultaneous resource scheduling and transportation planning. **PREREQS:** FE 102 and (FE 440 or FE 540)

FE 555. FOREST SUPPLY CHAIN MANAGEMENT (3). Develop and implement operational planning and logistics scheduling systems to manage a forestry supply chain for typical forest organizations in the Pacific Northwest. Once developed, these supply chain plans will be implemented using simulation software that will allow students to view the results of their forest operations plans. **PREREQS:** (CS 151 or FE 102) and FE 357 and FOR 457

FE 557. TECHNIQUES FOR FOREST RESOURCE ANALYSIS (4). Use of linear programming, nonlinear programming, dynamic programming, and simulation to solve complex forest management problems, with emphasis on intertemporal multiple-use scheduling. Forestry transportation problems, multiple-use allocation, and investment analysis. Field trips required. **CROSSLISTED** as FOR 457/FE 557. **PREREQS:** AREC 351 or FOR 330

FE 560. FOREST OPERATIONS REGULATIONS AND POLICY ISSUES (3). Reviews regulations and other policies that affect timber harvesting and other forest practices, particularly policies that address concerns of environment, safety, employment and transportation. Discusses how such rules and other policies evolve, including the role of public perceptions, forestry professionals and other key policy players. **PREREQS:** Senior standing.

FE 570. LOGGING MECHANICS (4). Relationship of torque, power, and thrust to the operation of cable and ground-based harvesting systems. On-highway and off-highway heavy truck performance. **PREREQS:** ENGR 211 and ENGR 213 and FE 371

FE 571. HARVESTING MANAGEMENT (3). Verification of harvesting assessment plans and operational planning/field layout. Practical logging skills related to harvest planning, operations monitoring, and designing worker training programs. **PREREQS:** FE 371 and FE 470

FE 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

FE 601. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

FE 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

FE 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

FE 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

FE 607. SEMINAR (1-16). Subject matter is required by graduate programs. This course is repeatable for a maximum of 16 credits.

FE 640. SPECIAL TOPICS IN FOREST ENGINEERING (1-3). Recent advances in logging engineering, forest engineering, and forest operations. Content will vary with instructor. May be retaken for credit. This course is repeatable for a maximum of 99 credits.

■ FORESTRY COURSES

FOR 111. INTRODUCTION TO FORESTRY (3). Forest resources in the world; forests and human well-being; where and how forests grow; environmental and human values; products, characteristics, and uses; basic elements of use, planning and management. Interpretation of forestry literature; professional origins in the U.S. Field trips required.

FOR 112. COMPUTING APPLICATIONS IN FORESTRY (3). An overview of computing applications used in all aspects of forestry work, but largely focused on development of intermediate and advanced spreadsheet skills using Microsoft Excel (e.g., complex formulas and functions, charting, and pivot tables). Additionally, the course rounds out essential skills in document formatting and presentation development.

FOR 199. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 16 credits.

FOR 220. AERIAL PHOTO INTERPRETATION AND FOREST MEASUREMENTS (4). An introduction to the field collection of forest measurements and the aerial photos used to assess the forest resource. The spatial relationship of field and photo-based data are emphasized and related to the building of a geographic information system. Successful completion of FOR 220 should help students compete for summer jobs requiring measurements skills. Lec/lab. **PREREQS:** ((MTH 105* or MTH 111* or MTH 112* or MTH 241* or MTH 245*) and FOR 111*)

FOR 307. JUNIOR SEMINAR (1). College is the time to develop the skills necessary for the transition between academics and career. In conjunction with the expertise already available on campus, this course will guide students through career planning, exploration, placement, and employer expectations. **CROSSLISTED** as FE 307.

FOR 312X. FORESTRY FIELD SCHOOL (2). A hands-on experience in the major aspects of forestry, including regeneration surveys, silviculture, cruising, recreation, forest disturbances, logging site and mill visits, east and west of the Cascades Range. **CROSSLISTED** as FE 312X. **PREREQS:** Admission into a professional school in the Forestry, Forest Engineering, or Forest Engineering/Civil Engineering program.

FOR 321. FOREST MENSURATION (5). Theory and practice of sampling and cruising techniques; stratified and nonstratified sampling systems with fixed plots, variable plots, and 3-P designs. **PREREQS:** (FOR 220 or (FE 308 and FE 309) and (MTH 241 or MTH 245 or MTH 251 or MTH 251H) and (ST 314 and FE 314) or (ST 351 or ST 351H) and ST 352)

FOR 322. FOREST MODELS (3). Introduction to static and dynamic forest models: defining what they are, how they might be used, and, in general terms, how they are developed. **PREREQS:** (FOR 321 and MTH 241 and (ST 351 or ST 351H) and ST 352)

FOR 330. FOREST CONSERVATION ECONOMICS (4). Basic arithmetic of interest and capital budgeting. Basic wood products markets. Forest resource markets and market failures. Nonmarket valuation and multiple-use forestry. Impacts of forest management and policy decisions on forest resource use. Lec/lab. **PREREQS:** ((AREC 250 or ECON 201 or ECON 201H) and (MTH 241 or MTH 245 or MTH 251 or MTH 251H))

FOR 331. FOREST RESOURCE ECONOMICS II (4). Forest products markets, appraisal, rotation, thinning, uneven-aged management and forest regulation. Economics of timber management and harvest scheduling. **PREREQS:** ((ECON 201* or ECON 201H*) and FOR 330* and MTH 241* and ST 352*) and/or instructor approval.

FOR 346. TOPICS IN WILDLAND FIRE (3). An interdisciplinary survey of concepts relating to fire science, ecology, management, and policy. Includes case studies of several representative ecosystems, ranging from west- and eastside forests of the Pacific Northwest to shrub steppe ecosystems of the Intermountain West and chaparral ecosystems of southern California. Distance and campus-based delivery using videos, website, and discussion. **CROSSLISTED** as FW 346, RNG 346. **PREREQS:** Course work in forest biology or ecology (e.g. FOR 240 or FOR

341) or equivalent.

FOR 390. FORESTRY FOR TEACHERS (3).

Cooperative learning and critical thinking skills used in discussions and labs to introduce forestry concepts to pre-teachers of K-12 students. Includes forest ecology, forest products, management practices, and conservation of forest resources. Field trips to Cascades and Coast Range required. Lec/lab.

FOR 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

FOR 399H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

FOR 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

FOR 403. THESIS (1-16). PREREQS: Departmental approval required.

FOR 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

FOR 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

FOR 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

FOR 408. WORKSHOP (1-3). This course is repeatable for a maximum of 16 credits.

FOR 410. INTERNSHIP (1-16). Full-time supervised professional experience emphasizing functional proficiency under joint sponsorship of university and agency personnel. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** FOR 251 and FOR 351 and FOR 356 and FOR 391 and FOR 407-Section 020 are recommended and may be taken concurrently. Departmental approval required.

FOR 411. COOPERATIVE EDUCATION MENTORED WORK EXPERIENCE (1). College is the time to develop the skills necessary for the transition between academics and career. Cooperative Education Mentored Work Experience is a graded field experience in which the student protegee will apply academic study in a "real world" career setting. **CROSSLISTED** as FE 411. This course is repeatable for a maximum of 4 credits. **PREREQS:** Professional forestry students only.

FOR 417X. ADVANCED FOREST SOILS (4). Synthesize current information on fundamental properties and processes of forest soils with emphasis on applications to silviculture, soil conservation, and sustainable management of forested ecosystems. **PREREQS:** SOIL 205 and ((CH 231 and CH 261) or CH 201) and (MTH 241 or MTH 251 or MTH 252) and /or instructor's permission.

FOR 421. SPATIAL ANALYSIS OF FORESTED LANDSCAPES (3). Geographic information systems (GIS), literature review, seminars, and project work involving forest resources, wildlife habitat, and landscape ecology using remotely sensed data, digital elevation models, and other spatial data. Lec/rec. Offered even years, during winter term. **PREREQS:** A GIS course (GEO 265 or FE 357 or GEO 465 or GEO 565) or the equivalent.

FOR 429. INTEGRATED PRESCRIPTIONS (3). Using an actual stand and real data, we will cultivate systematic approaches for: 1) characterizing site conditions and limiting factors; 2) harmonizing multiple management objectives; 3) modeling long-term responses to silvicultural manipulations; 4) assessing environmental impacts; 5) building public acceptance; and 6) communicating alternatives and rationales for decisions. This expanded course will allow a deeper project experience and more integration among the faculty in the co-requisite course, and providing the lab component of three other inter-

related forest management courses. **PREREQS:** (FOR 240 and FOR 321) and /or equivalents. **COREQS:** FOR 443

FOR 436. WILDLAND FIRE SCIENCE AND MANAGEMENT (4). Principles and applications of fire as a natural resource management tool; the role of fire in conservation management, restoration, and preservation of ecosystems. Covers basic techniques and current research used to describe fire behavior and spread, fuels and fuel manipulation, and fire effects on the biota. Focus will be on fire as a natural process in ecosystem dynamics. Lec/lab. **CROSSLISTED** as RNG 436/RNG 536.

FOR 441. SILVICULTURE PRINCIPLES (4). Nursery operation, vegetation management, herbivores, fire, seeding and planting techniques. Introduction to principles and techniques involving vegetation control, thinning, fertilizing, and harvesting. Environmental considerations related to forest stand treatments. Lec/lab. **PREREQS:** (FOR 240 and (FOR 141 or FOR 241))

FOR 442. SILVICULTURE REFORESTATION (4). Seed, seedlings, and cuttings. Nursery operation, planting techniques, seeding and vegetation management. Herbivores, uses of fire in reforestation. Field trips required. Lec/lab. **PREREQS:** ((CSS 205 or SOIL 205 or CSS 305) and (FOR 240 or BOT 331 or BOT 341))

FOR 443. SILVICULTURAL PRACTICES (5). Manipulation of immature and mature forest stands for various resource management objectives. Principles and techniques involving vegetation control, thinning, fertilizing, and harvesting. Environmental considerations related to stand treatments. Two-day field trips required. Lec/lab. **PREREQS:** (FOR 240 and FOR 321) and /or equivalents. **COREQS:** FOR 429

FOR 456. *INTERNATIONAL FORESTRY (3). An introduction to the biological, physical, and sociological factors that shape the world's forests and the activities used to manage those forests. What influence these factors have on forest policies, practices, and outcomes. **CROSSLISTED** as FE 456. (Bacc Core Course) **PREREQS:** Introductory course in biology.

FOR 457. TECHNIQUES FOR FOREST RESOURCE ANALYSIS (4). Use of linear programming, nonlinear programming, dynamic programming, and simulation to solve complex forest management problems, with emphasis on intertemporal multiple use scheduling. Forestry transportation problems, multiple-use allocation, and investment analysis. Field trips required. **CROSSLISTED** as FE 457/FE 557. **PREREQS:** AREC 351 or FOR 330

FOR 459. FOREST RESOURCE PLANNING AND DECISION MAKING (4). Integration of biological, economic, and amenity characteristics of the forest system in resource management planning and decision making. Senior capstone class projects. Field trips required. Lec/lab. **PREREQS:** Senior standing or departmental approval required.

FOR 460. ^FOREST POLICY (4). Policy formulation and analysis for forest resources. Consideration of policy affecting land management approaches to planning, management, and social and economic development. Major forestry policy areas covered include outdoor recreation, range, timber, wilderness, and wildlife and fish. Lec/lab. (Writing Intensive Course) **PREREQS:** Senior standing.

FOR 462. NATURAL RESOURCE POLICY AND LAW (3). First of two offerings designed to provide an introduction to current environmental and natural resource law issues and disputes for students who will have to meet, consult, and work with lawyers throughout their professional career. Focus is on mechanisms governing resource allocation within the constraints of private property rights. Emphasis is placed on the federal Endangered Species Act and its relation

to water allocation and public trust doctrines. Students will also gain a broad understanding of regulatory «takings» law and the evolving dynamic of government-imposed constraints on private property rights in the context of natural resource and species protection.

FOR 499. SPECIAL TOPICS (1-16). Topics of current importance in forest resources issues, education, policies, economics, management, business, social values, silviculture, and biometrics. Topics will change from term to term. May be repeated with different topics for credit. Section 8: Social aspects of natural resource management (3 credits) graded. This course is repeatable for a maximum of 16 credits. **PREREQS:** Senior or graduate standing.

FOR 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

FOR 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

FOR 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

FOR 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

FOR 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

FOR 508. WORKSHOP (1-3). This course is repeatable for a maximum of 16 credits.

FOR 510. INTERNSHIP (1-9). This course is repeatable for a maximum of 16 credits.

FOR 517X. ADVANCED FOREST SOILS (4). Synthesize current information on fundamental properties and processes of forest soils with emphasis on applications to silviculture, soil conservation, and sustainable management of forested ecosystems. **PREREQS:** SOIL 205 and ((CH 231 and CH 261) or CH 201) and (MTH 241 or MTH 251 or MTH 252) or instructor's permission.

FOR 521. SPATIAL ANALYSIS OF FORESTED LANDSCAPES (3). Geographic information systems (GIS), literature review, seminars, and project work involving forest resources, wildlife habitat, and landscape ecology using remotely sensed data, digital elevation models, and other spatial data. Lec/rec. Offered even years, during winter term. **PREREQS:** A GIS course (GEO 265 or FE 357 or GEO 465 or GEO 565) or the equivalent.

FOR 524. FOREST BIOMETRICS (3). Advanced topics in forest biometrics, including measurement of forest structure and dynamics, application of sampling theory and methods, and statistical techniques for interpreting forestry data. **PREREQS:** FOR 322 and ST 511

FOR 525. FOREST MODELING (3). Examination of regression techniques and assumptions used to develop static and dynamic equations of tree and stand attributes. **PREREQS:** ST 552 and /or instructor approval.

FOR 534. ECONOMICS OF THE FOREST RESOURCE (3). Economic aspects of forest production, regulation, and silvicultural applications. Microeconomic interactions of forest production and regulation and environmental constraints. Offered alternate years. **PREREQS:** FOR 330 and FOR 331 or equivalent

FOR 536. WILDLAND FIRE SCIENCE AND MANAGEMENT (4). Principles and applications of fire as a natural resource management tool; the role of fire in conservation management, restoration, and preservation of ecosystems. Covers basic techniques and current research used to describe fire behavior and spread, fuels and fuel manipulation, and fire effects on the biota. Focus will be on fire as a natural process in ecosystem dynamics. Lec/lab. **CROSSLISTED** as RNG 436/RNG 536.

FOR 537. VALUATION OF NON-MARKET RESOURCES (3). Focuses on the theory and methods for estimating the economic value of non-market resources (e.g. clean air and water, biodiversity, nature-based recreation, etc.). Blends the theory and econometrics of non-market valuation through hands-on applications of methods with real datasets. The valuation of non-market resources is a burgeoning field within applied economics and should continue to grow in both importance and applications. **PREREQS:** AREC 512 or ECON 512 or equivalent

FOR 543. SILVICULTURAL PRACTICES (5). Manipulation of immature and mature forest stands for various resource management objectives. Principles and techniques involving vegetation control, thinning, fertilizing, and harvesting. Environmental considerations related to stand treatments. Two-day field trips required. **PREREQS:** FOR 240 and FOR 321 or equivalents. **COREQS:** FOR 429.

FOR 546. WILDLAND FIRE ECOLOGY (3). Coverage of fire histories and ecology of major forest, rangeland and wetland ecosystems. Includes fire interactions with physical and biotic components of ecosystems, role of fire in ecological processes, and utilization in natural resource management. **CROSSLISTED** as FW 446/FW 546 and RNG 446/RNG 546. **PREREQS:** Course work in ecology and natural resource management.

FOR 547. TROPHIC CASCADES (2-3). Theory and empirical analysis of terrestrial carnivore effects on plants and ecosystems as mediated through herbivores. Emphasis on large carnivores, frequency/strength of trophic cascades, implications for ecosystem function, management, and restoration. Lectures, current literature, discussions, field exercise, term paper, and student presentations. Offered every odd year in spring. **CROSSLISTED** as FW 547. **PREREQS:** Graduate or post-bac standing and ecology course.

FOR 550. SUSTAINABLE FOREST MANAGEMENT (3). An overview of the role of forests in providing products and ecosystem services around the world and criteria and indicators of sustainable forest management, forest policy, and regulations. **PREREQS:** Graduate student standing or permission of instructor.

FOR 557. TECHNIQUES FOR FOREST RESOURCE ANALYSIS (4). Use of linear programming, nonlinear programming, dynamic programming, and simulation to solve complex forest management problems, with emphasis on intertemporal multiple use scheduling. Forestry transportation problems, multiple-use allocation, and investment analysis. Field trips required. **CROSSLISTED** as FE 457/FE 557. **PREREQS:** AREC 351 or FOR 330

FOR 561. FOREST POLICY ANALYSIS (3). Basic elements of forest policy problems, including resource allocation and efficiency, distribution, and interpersonal equity, taxation, regulation, and control, and planning and uncertainty. Emphasis on policy and analysis and its uses in policy decision.

FOR 562. NATURAL RESOURCE POLICY AND LAW (3). First of two offerings designed to provide an introduction to current environmental and natural resource law issues and disputes for students who will have to meet, consult, and work with lawyers throughout their professional career. Focus is on mechanisms governing resource allocation within the constraints of private property rights. Emphasis is placed on the federal Endangered Species Act and its relation to water allocation and public trust doctrines. Students will also gain a broad understanding of regulatory «takings» law and the evolving dynamic of government imposed constraints on private property rights in the context of natural resource and species protection.

FOR 563. ENVIRONMENTAL POLICY AND LAW INTERACTIONS (3). Second of two offerings designed to provide an introduction to current environmental and natural resource law issues and disputes for students who will have to meet, consult, and work with lawyers throughout their professional career. Focus is on the arena of regulatory environmental laws. Environmental torts, regulation of point and non-point source pollution under the federal Clean Water Act, wetlands protection, and laws governing agricultural and forest practices will be examined as examples of regulatory frameworks for achieving resource protection. Students will be exposed to the basic framework of federal laws regulating air and hazardous waste pollutants.

FOR 599. SPECIAL TOPICS (1-16). Topics of current importance in forest resources issues, education, policies, economics, management, business, social values, silviculture, and biometrics. Topics will change from term to term. May be repeated with different topics for credit. Section 8: Social aspects of natural resource management (3 credits) graded. This course is repeatable for a maximum of 16 credits. **PREREQS:** Senior or graduate standing.

FOR 601. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

FOR 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

FOR 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

FOR 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

FOR 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

FOR 699. SPECIAL TOPICS (1-16). Topics of current importance in forest resources issues, education, policies, economics, management, business, social values, silviculture, and biometrics. Topics will change from term to term. May be repeated with different topics for credit. This course is repeatable for a maximum of 16 credits.

FOR 808. WORKSHOP (1-9). This course is repeatable for a maximum of 16 credits.

WOOD SCIENCE AND ENGINEERING

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FACULTY

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Associate Professors Leavengood, Muszynski
Assistant Professors Knowles, Sinha
Instructor Smith

AFFILIATE FACULTY

Boehner, Broline, Cao, Leichti, Toppinen

ADJUNCT FACULTY

B. Lachenbruch (Forest Ecosystems and Society), T. Miller (Civil and Construction Engineering)¹

¹Licensed Professional Engineer

Undergraduate Major

Renewable Materials (BS, CRED, HBS)

Options

Science and Engineering
Management and Marketing

Minor

Renewable Materials

Graduate Major

Wood Science (MAIS, MS, PhD)

Graduate Areas of Concentration
Biodeterioration and Materials Protection

Chemistry and Chemical Processing
Forest Products Business and Marketing
Physics and Moisture Relations
Process Modeling and Analysis
Renewable Materials Science and Engineered Composites
Wood Anatomy and Quality
Wood Engineering and Mechanics

Graduate Minor

Wood Science

Use of renewable materials is increasing as the world becomes more concerned about climate change and population growth. Americans use thousands of different products from renewable wood each year—by weight more than we do of steel, cement and plastic combined. To meet the growing demand for renewable materials and to maximize the benefits of bio-energy and renewable products we must be smarter in how and where

we use them. New opportunities for the world through renewable materials is the core of wood science and engineering at OSU.

The department is a world leader in research, outreach and education related to renewable wood-based materials and products. It offers an undergraduate degree program that prepares students for diverse careers in the private sector that is a major component of the Pacific Northwest economy and around the world. Graduates are in high demand as climate change concerns and advanced technology accelerate the transformation to a globally competitive, green renewable materials-based industry.

The department also offers MS and PhD degrees in Wood Science. These graduate programs ensure a foundation in science that is supplemented with programs tailored to student interest. Many students pursue dual majors in science or engineering fields. Interested students should see the department Web page for more information or contact the department head.

RENEWABLE MATERIALS (BS, CRED, HBS)

The Bachelor of Science degree in Renewable Materials program is a multi-disciplinary professional program that prepares students to work with renewable, plant-based materials to solve challenging world problems. Renewable materials such as wood, bamboo, canes, and agricultural fibers are examined to understand their characteristics and how to make useful products. Students gain broad perspectives on current issues associated with the sustainable utilization of renewable materials, including global trade, business innovation, energy production, and environmental impacts.

The curriculum includes a lower-division core in science and math with a choice of upper-division option tracks in either marketing and management (M&M) or science and engineering (S&E). The M&M option is designed for students interested in business. Completion of the M&M option and meeting additional grade requirements of the College of Business will fulfill the requirements for a transcript-visible Business and Entrepreneurship minor. The S&E option is a flexible program that allows technically oriented students to design a personalized curriculum that opens doors to jobs that solve complex problems or to graduate school. Students select courses (often minors) that complement their interests.

In addition to the course work, all students must have six months of work experience in an area related to their major. This is usually accomplished by two summers of employment in business or industry, but it may include work during the academic year. The department has

an established network of connections to help place students in internships and summer employment.

Graduates with degrees in renewable materials are highly sought after to work in business, manufacturing operations, and technical support where they use their knowledge and expertise to help develop sustainable products, industrial systems, and economies.

Baccalaureate Core Requirements (30)

(Not satisfied by the Renewable Materials core or an option.)

Fitness: HHS 231. *Lifetime Fitness for Health (2)
and HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)
or any PAC course (1–2)
Writing I: WR 121. *English Composition (3)
Writing II: WR 214. *Writing in Business (3)
or WR 327. *Technical Writing (3)
Speech: COMM 111. *Public Speaking (3)
or COMM 114. *Argument and Critical Discourse (3)
Cultural Diversity elective (3)
Difference, Power, and Discrimination elective (3)
Literature and Arts elective (3)
Western Culture elective (3)
Science, Technology, and Society Synthesis elective (3)
Global Issues Synthesis elective (3)

Renewable Materials Core (63)

BI 101. *General Biology (4)
or BI 212. *Principles of Biology (4)
or FES 240. *Forest Biology (4)
ECON 201. *Introduction to Microeconomics (4)
ECON 202. *Introduction to Macroeconomics (4)
FOR 111. Introduction to Forestry (3)
FOR 112. Computing Applications in Forestry (3)
FES 141. Tree and Shrub Identification (3)
WSE 111. Renewable Materials for a Green Planet (2)
WSE 210. *Renewable Materials Technology and Utilization (4)
WSE 321. Chemistry of Renewable Materials (3)
WSE 322. Physical and Mechanical Properties of Renewable Materials (4)
WSE 324. Renewable Materials Laboratory (3)
WSE 415. Renewable Materials in the Modern Age (3)
WSE 453. ^Global Trade in Renewable Materials (3)
WSE 455. Marketing and Innovation in Renewable Materials (4)
WSE 461. Manufacturing with Renewable Materials I (4)
WSE 462. Manufacturing with Renewable Materials II (4)
WSE 465. Renewable Materials Manufacturing Experience (2)
WSE 471. Renewable Materials in Building Construction (3)
WSE 473. Bioenergy and Environmental Impact (3)

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

MANAGEMENT AND MARKETING OPTION

This option provides students with the skills to manage organizations to be competitive in the global renewable materials marketplace or develop innovative and effective marketing programs for green products.

BA 211. Financial Accounting (4)
BA 213. Managerial Accounting (4)
BA 230. Business Law I (4)
BA 260. Introduction to Entrepreneurship (4)
BA 351. Managing Organizations (4)
BA 360. Introduction to Financial Management (4)
BA 390. Marketing (4)
CH 121. General Chemistry (5)
CH 122. *General Chemistry (5)
MTH 111. *College Algebra (4)
MTH 241. *Calculus for Management and Social Science (4)
ST 351, ST 352. Introduction to Statistical Methods (4,4)
Free Electives (11)

Restricted Electives (min. of 24)
Select a minimum of 12 credits from the following list, and develop an approved "Area of Concentration" as described below:

AREC 352. Environmental Economics and Policy (3)
BA 357. Operations Management (4)
BA/MGMT 364. Project Management (4)
BA/MRKT 396. Fundamentals of Marketing Research (4)
BA/MGMT 452. Leadership (4)
BA 458. Innovation and New Product Development (4)
BA 460. Venture Management (4)
BA/MRKT 497. Global Marketing (4)
ECON 340. International Economics (4)

Approved "Area of Concentration" (minimum of 12 approved credits including 8 upper-division credits) may be satisfied by completing a program of study approved by the department's lead advisor.

Total=89

Note: Completion of the M&M option and meeting additional grade requirements of the College of Business will fulfill the requirements for a transcript-visible Business and Entrepreneurship minor. Students who graduate and complete the minor may also apply to the College of Business to enroll in a 58-credit, four-term MBA degree program.

Footnote:

* Baccalaureate Core Course

SCIENCE AND ENGINEERING OPTION

This is a flexible, math- and science-intensive program that allows students to design a personalized curriculum that opens doors to jobs that solve complex

problems, create efficiencies, foster intelligent use of renewable materials, or to graduate school. Students select a group of courses (often minors) that complement their interests.

BA 215. Fundamentals of Accounting (4)
 BA 230. Business Law I (4)
 CH 121. General Chemistry (5)
 CH 122. *General Chemistry (5)
 CH 123. *General Chemistry (5)
 MTH 251. *Differential Calculus (4)
 MTH 252. Integral Calculus (4)
 MTH 254. Vector Calculus I (4)
 PH 211, PH 212, PH 213. *General Physics with Calculus (4,4,4)
 ST 351, ST 352. Introduction to Statistical Methods (4,4)
 Free Electives (11)
 Approved "Area of Concentration" (minimum of 27 approved credits including 12 upper-division credits)

Total=93

Note: The area of concentration may be satisfied by completing an approved minor in another field or an integrated program of study approved by the department's lead advisor.

Footnote:

* Baccalaureate Core Course

RENEWABLE MATERIALS MINOR

The minor in Renewable Materials exposes students to the world of renewable materials science and technology and will enable students in other majors to gain a specialization that will make them more competitive for careers associated with green materials and allied industries.

Core Courses (16 credits)

CH 122. *General Chemistry (5)
 WSE 210. *Renewable Materials Technology and Utilization (4)
 WSE 321. Chemistry of Renewable Materials (3)
 WSE 322. Physical and Mechanical Properties of Renewable Materials (4)

Select from the following courses (minimum of 11 credits)

FOR 111. Introduction to Forestry (3)
 WSE 324. Renewable Materials Lab (3)
 WSE 415. Renewable Materials in the Modern Age (3)
 WSE 453. ^Global Trade in Renewable Materials (3)
 WSE 455. Marketing and Innovation in Renewable Materials (4)
 WSE 461. Manufacturing with Renewable Materials I (4)
 WSE 462. Manufacturing with Renewable Materials II (4)
 WSE 465. Renewable Materials Manufacturing Experience (2)
 WSE 471. Renewable Materials in Building Construction (3)
 WSE 473. Bioenergy and Environmental Impact (3)

Students must complete a minimum of 27 credits for the minor, at least 12 of which must be upper division.

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

WOOD SCIENCE (MS, PhD, MAIS)

Graduate Areas of Concentration

Biodeterioration and materials protection, chemistry and chemical processing, forest products business and marketing, physics and moisture relations, process modeling and analysis, renewable materials science and engineered composites, wood anatomy and quality, wood engineering and mechanics

The Department of Wood Science and Engineering offers graduate programs leading toward the Master of Science and Doctor of Philosophy degrees in Wood Science. Thesis research and academic programs can be developed in the many special disciplines represented by the faculty. Minors are most commonly selected from statistics, engineering, chemistry, botany, plant pathology, or business.

Many students pursue a dual major degree in wood science and a field of engineering or science. A wide variety of science, engineering and business opportunities are available.

Graduate students in wood science come from a wide range of undergraduate degree programs in science, engineering and business.

Excellent laboratories are available for teaching and research in Richardson Hall, Peavy Hall, and the Oak Creek Laboratory. Student research involves seeking solutions to current problems in renewable materials science, other sciences such as chemistry, physics and biology, engineering, business or related fields. Most graduate students are employed as part-time graduate research assistants.

Graduates with advanced degrees find employment in research and development, management or technical positions in the private sector, as university faculty or in technical public service positions.

WOOD SCIENCE GRADUATE MINOR

For more details, see the departmental advisor or major professor.

COURSES

WSE 111. RENEWABLE MATERIALS FOR A GREEN PLANET (2). Renewable materials are an integral part of modern lifestyles, and current societal trends point to increased use of renewable materials. This course provides an overview of renewable materials and their current applications in society. As an overview course, it covers a breadth of renewable material uses and exposes students to life-cycle thinking.

WSE 210. RENEWABLE MATERIALS TECHNOLOGY AND UTILIZATION (4). Characteristics and uses of renewable fiber products including wood, bamboo and grasses; manufacturing processes; effect of tree growth and harvesting on renewable products manufacturing and properties. Wood identification. Lec/lab.

WSE 266. *INDUSTRIAL HEMP (3). Introduction to the botany, biology and agronomy of the hemp plant, and the origins, historical contexts and implications of contemporary legal and social issues surrounding its use for food, fiber, and building products. Taught via Ecampus only. (Bacc Core Course)

WSE 321. CHEMISTRY OF RENEWABLE MATERIALS (3). Chemical structures and chemical properties of renewable plant-based materials will be taught at molecular levels. Chemical compositions of different renewable materials will be covered. Chemical and biochemical modifications and applications or renewable materials will be discussed in detail. Lec/lab. **PREREQS:** CH 122 or CH 202 or CH 232 or CH 232H and .

WSE 322. PHYSICAL AND MECHANICAL PROPERTIES OF RENEWABLE MATERIALS (4). Introduction to thermodynamics and mechanics of plant fibers, solid wood and bio-based composites: hygroscopicity; heat and mass transport; statics, elasticity and strength of materials; mechanical properties. **PREREQS:** WSE 321

WSE 324. RENEWABLE MATERIALS LABORATORY (3). Integrates the knowledge gained in the core science courses (WSE 321 and WSE 322) to help students obtain a deeper understanding of how chemistry, physics, and anatomy affect renewable material properties. The course uses renewable fiber materials such as hardwoods, softwoods, natural fibers, bamboo, composite wood products (e.g. OSB, plywood, MDF, etc.) and fiber-based products (e.g. wood-plastic composites, natural fiber composites, straw panels, paper, etc.) to examine the intricate relationships between fundamental properties and performance. Lec/lab. **PREREQS:** (WSE 321 and WSE 322)

WSE 373. WOOD MACHINING I (3). Familiarizes students with precision, accuracy standards and procedures necessary in the manufacture of value-added secondary wood products. Lab fee. Lec/lab.

WSE 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

WSE 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

WSE 403. THESIS (1-16). PREREQS: Departmental approval required.

WSE 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

WSE 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

WSE 415. RENEWABLE MATERIALS IN THE MODERN AGE (3). Micro-renewable materials anatomy course taught within an interdisciplinary, hands-on format. Suitable for all majors and backgrounds. Course covers the micro- and macro-anatomy of wood and other common renewable materials like bamboo and cellulose fibers. Utilizes studio-based learning. **CROSSLISTED AS DHE 415.**

WSE 453. ^GLOBAL TRADE IN RENEWABLE MATERIALS (3). Provides basic skills to operate in the global business environment. To include understanding the role of culture in international business, types of international business, policy considerations, ethics, trade barriers, exchange rates, shipping, global industry structure, and other current issues. Examines specific examples from renewable materials industries. (Writing Intensive Course) **PREREQS:** ECON 201 and ECON 202 or instructor consent.

WSE 455. MARKETING AND INNOVATION IN RENEWABLE MATERIALS (4). Marketing, innovation and their application in the renewable products industries.

WSE 458. WOOD DESIGN (4). Study of basic wood properties and design considerations. Design and behavior of wood connectors, beams, columns and beam columns. Introduction to plywood and glue laminated members. Analysis and design of structural diaphragms and shear walls. Lec/lab. CROSSLISTED as CE 484.
PREREQS: CE 383 or CE 484 and with minimum grade of C, senior standing or graduate

WSE 461. MANUFACTURING WITH RENEWABLE MATERIALS I (4). Manufacturing renewable materials such as wood, bamboo, hemp, and cereal straws into products requires size reduction and separation of components. The components are then further processed, in many cases by joining with glue or fasteners, to create a usable product. The major processing steps for the conversion of raw materials into products will be discussed. **PREREQS:** WSE 210 and WSE 321 and WSE 324

WSE 462. MANUFACTURING WITH RENEWABLE MATERIALS II (4). The second of a two-term series exploring technologies and management practices associated with manufacturing products from renewable materials. Subjects covered include process automation, quality control, safety, and preventive maintenance programs. **PREREQS:** WSE 461 or WSE 561; may be waived with instructor approval.

WSE 465. RENEWABLE MATERIALS MANUFACTURING EXPERIENCE (2). Learning about and visiting a number of renewable materials industrial and commercial operations representing all parts of the renewable materials value chain. The class will meet daily for one 5-day week immediately prior to the start of fall term. During the week, the students and at least one instructor will meet daily. Lectures will precede visits to industrial plants, mills and sites. At the end of the day, an instructor will participate in a debriefing session, reiterating what was learned during the day. Students will then submit a report on the day's activities. The class includes daily travel and overnight stays. This course is repeatable for a maximum of 4 credits.

WSE 470. *FORESTS, WOOD, AND CIVILIZATION (3). Multidisciplinary examination of issues related to the roles of forests, trees, and wood in civilization, as providers of commodities, ecosystem services, and spiritual and artistic inspiration. Issues include global supply and demand, wood ownership and political power, and perceptions and uses of forest resources in different societies. (Bacc Core Course)

WSE 470H. *FORESTS, WOOD, AND CIVILIZATION (3). Multidisciplinary examination of issues related to the roles of forests, trees, and wood in civilization, as providers of commodities, ecosystem services, and spiritual and artistic inspiration. Issues include global supply and demand, wood ownership and political power, and perceptions and uses of forest resources in different societies. (Bacc Core Course)
PREREQS: Honors College approval required.

WSE 471. RENEWABLE MATERIALS IN BUILDING CONSTRUCTION (3). Building construction is a major application of renewable materials, primarily wood. This course explores material selection options, applications, and performance characteristics. Residential construction is emphasized, but non-residential construction applications will also be discussed. Concepts and interpretation of life cycle assessment are introduced. **PREREQS:** Junior standing.

WSE 473. BIOENERGY AND ENVIRONMENTAL IMPACT (3). Explores world's use of woody biomass fuels, their potential to contribute to our region's energy supply, and conversion technologies such as direct combustion, pyrolysis, and thermochemical modification. Also examines emissions and other environmental impacts of utilizing renewable materials to generate energy and manufacture products. **PREREQS:** ((MTH 111

or MTH 112 or MTH 231 or MTH 241 or MTH 255 or MTH 251 or MTH 251H) and (CH 122 or CH 222)) and/or graduate standing.

WSE 475. ENVIRONMENTAL ASSESSMENT OF BUILDING MATERIALS (4). Study of sustainability in the built environment from a building material perspective. Understanding the ecology of building materials and assessing their environmental sustainability performance using life cycle analysis. Critical discussion of case studies and future of LCA in the built environment. **PREREQS:** Junior in good academic standing.

WSE 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 99 credits.

WSE 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

WSE 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

WSE 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

WSE 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

WSE 507. SEMINAR (1). Section 1: Beginning Seminar. Section 2: Seminar. Graded P/N. This course is repeatable for a maximum of 99 credits.

WSE 515. RENEWABLE MATERIALS IN THE MODERN AGE (3). Micro-renewable materials anatomy course taught within an interdisciplinary, hands-on format. Suitable for all majors and backgrounds. Course covers the micro- and macro-anatomy of wood and other common renewable materials like bamboo and cellulose fibers. Utilizes studio-based learning. CROSSLISTED as DHE 515.

WSE 520. THE GLOBAL CONTEXT OF THE FOREST SECTOR (3). Provides a broad knowledge base of business and marketing practices in the global forest industry. Includes a module on research ethics that fulfills OSU Graduate School requirements.

WSE 521. WOOD SCIENCE I (4). A comprehensive overview and integration of wood anatomy, wood physics, wood chemistry and wood mechanics; global contemporary issues impacting the wood and fiber sector; integration of basic wood sciences to understand the complex relationships between environment and wood material properties, and the influence of both on the use of wood-based materials.

WSE 522. WOOD SCIENCE II (4). Continuation of the comprehensive overview and integration of wood and fiber anatomy, physics, chemistry, and mechanics; integration of basic wood science to understand relationships with wood and fiber properties and their impact on final use. Focus on biological, chemical and physical degradation of wood; adhesion; and physical and engineering properties of wood. Lec/lab.

WSE 530. POLYMER COMPOSITES (3). A comprehensive survey of the material and mechanical properties of polymer-based composite materials including failure mechanisms, interfacial and nanoscale effects, and transport and thermal properties. **PREREQS:** CHE 545. Recommended: multivariable calculus.

WSE 535. POLYMER SYNTHESIS AND STRUCTURE (3). A comprehensive overview of various synthetic methods for various synthetic polymers; structures of various synthetic and natural polymers. **PREREQS:** 3 credits of undergraduate organic chemistry or CH 331 or CH 334 are recommended.

WSE 553. GLOBAL TRADE IN RENEWABLE MATERIALS (3). Provides basic skills to operate in the global business environment. To include understanding the role of culture in international business, types of international business, policy considerations, ethics, trade barriers, exchange rates, shipping, global industry structure, and

other current issues. Examines specific examples from renewable materials industries. **PREREQS:** ECON 201 and ECON 202 or instructor consent.

WSE 555. MARKETING AND INNOVATION IN RENEWABLE MATERIALS (4). Marketing, innovation and their application in the renewable products industries.

WSE 558. WOOD DESIGN (4). Study of basic wood properties and design considerations. Design and behavior of wood connectors, beams, columns and beam columns. Introduction to plywood and glue laminated members. Analysis and design of structural diaphragms and shear walls. Lec/lab. CROSSLISTED as CE 584.
PREREQS: CE 383 or CE 481 with minimum grade of C, senior standing or graduate

WSE 561. MANUFACTURING WITH RENEWABLE MATERIALS I (4). Manufacturing renewable materials such as wood, bamboo, hemp, and cereal straws into products requires size reduction and separation of components. The components are then further processed, in many cases by joining with glue or fasteners, to create a usable product. The major processing steps for the conversion of raw materials into products will be discussed. **PREREQS:** WSE 210 and WSE 321 and WSE 324

WSE 562. MANUFACTURING WITH RENEWABLE MATERIALS II (4). The second of a two-term series exploring technologies and management practices associated with manufacturing products from renewable materials. Subjects covered include process automation, quality control, safety, and preventive maintenance programs. Graduate students are responsible for preparing case studies to demonstrate how manufacturing management programs are integrated into operations. **PREREQS:** WSE 461 or WSE 561; may be waived with instructor approval.

WSE 571. RENEWABLE MATERIALS IN BUILDING CONSTRUCTION (3). Building construction is a major application of renewable materials, primarily wood. This course explores material selection options, applications, and performance characteristics. Residential construction is emphasized, but non-residential construction applications will also be discussed. Concepts and interpretation of life cycle assessment are introduced. **PREREQS:** Junior standing.

WSE 573. BIOENERGY AND ENVIRONMENTAL IMPACT (3). Explores world's use of woody biomass fuels, their potential to contribute to our region's energy supply, and conversion technologies such as direct combustion, pyrolysis, and thermochemical modification. Also examines emissions and other environmental impacts of utilizing renewable materials to generate energy and manufacture products. **PREREQS:** (MTH 111 or MTH 112 or MTH 231 or MTH 241 or MTH 245 or MTH 251 or MTH 251H) and (CH 122 or CH 222) or graduate standing.

WSE 575. ENVIRONMENTAL ASSESSMENT OF BUILDING MATERIALS (4). Study of sustainability in the built environment from a building material perspective. Understanding the ecology of building materials and assessing their environmental sustainability performance using life cycle analysis. Critical discussion of case studies and future of LCA in the built environment. **PREREQS:** Junior in good academic standing.

WSE 592. ADVANCED WOOD DESIGN (4). Study of advanced concepts in wood properties and design. Design and analysis of specialty wood connectors. Design of wood members for adverse conditions including fire design. Common failure mechanisms and forensic engineering concepts. Design for durability. Lec/lab. **PREREQS:** Graduate only. Undergraduates can take it for graduate credits. Understanding of basic concepts in mechanics and timber design is preferred.

WSE 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 99 credits.

WSE 601. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

WSE 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

WSE 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

WSE 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

WSE 607. SEMINAR (1). Section 1: Beginning Seminar. Section 2: Graduate Seminar. This course is repeatable for a maximum of 99 credits.

WSE 611. SELECTED TOPICS IN WOOD AND FIBER SCIENCE (1-3). May be taken more than once. This course is repeatable for a maximum of 6 credits.

WSE 699. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

Exciting and diverse educational opportunities are offered through the graduate programs of Oregon State University's 11 colleges which encompass 80 major disciplines. A land, sea, space, and sun grant university, OSU enrolls more than 4,000 graduate students, representing more than 90 countries and every state in the nation.

At OSU, maximum opportunity is provided for the integration of graduate instruction and research. The graduate faculty (1,800 members) is selected on the basis of training, experience, research, and evidence of the ability to successfully direct and supervise graduate students.

All study beyond the bachelor's degree at Oregon State University is conducted through the Graduate School. The establishment of departmental graduate programs and the formulation and direction of individual student programs are responsibilities of the departments, under the general rules and requirements of the Graduate School.

See the **Graduate Student Information section** of this catalog for complete details regarding graduate education and the policies governing graduate study.

INTRODUCTION TO GRADUATE STUDY AT OREGON STATE UNIVERSITY

Oregon State University has a global reputation for excellence in teaching, research, and engagement.

OSU is one of only two American universities to hold the land, sea, sun and space grant designations (Cornell University in Ithaca, NY, is the other) and is the only Oregon institution recognized for its "very high research activity" (RU/VH) by the Carnegie Foundation for the Advancement of Teaching. In 2012, OSU was also awarded the Community Engagement classification, again by the Carnegie Foundation. OSU is comprised of 11 academic colleges with strengths in natural resources, earth dynamics and sustainability, life sciences, innovation and entrepreneurship, and the arts and sciences. OSU has facilities and/or programs in every county in the state, including 11 regional experiment stations, 35 county extension offices, a branch campus in Bend, a major marine science center in Newport, and a range of programs and facilities in Portland. OSU is Oregon's largest public research university, conducting more than 60 percent of the research funded throughout the state's university system.

A dedicated and highly regarded graduate faculty, a well-equipped library, comprehensive special collections, and exceptional research facilities keep Oregon State at the leading edge of graduate education. Linus Pauling, an Oregon State alumnus and the only person to win individual Nobel prizes in two different categories, selected OSU as the repository for his papers.

Research and teaching assistantships are available to allow you the opportunity to work with people who are leaders in their fields while furthering your

education. In addition to being outstanding teachers, many OSU faculty members are internationally renowned for their research. In fiscal year 2012, Oregon State University received more than \$81 million in external support for research and scholarship.

With these strengths in research and teaching, Oregon State produces degree holders who can compete successfully with the best in their fields.

But life isn't all study and research, and when you're ready to take a break, you'll find that Oregon State is the ideal location for that as well. Whether you want to be active or relax, attend a sports event or a lecture, go to a concert or a play, or do just about anything else, you're likely to find what you want at Oregon State or just a short distance away.

OSU is located in Corvallis, a community of 54,670 people situated in the Willamette Valley between Portland and Eugene. Ocean beaches, lakes, rivers, forests, high desert, the rugged Cascade and Coast Ranges, and the urban amenities of the Portland metropolitan area are all within a 100 mile drive of Corvallis. Nearly 22,000 undergraduate, 590 first professional, and 4,000 graduate students are enrolled at OSU, including over 5,200 students of color and 2,360 international students.

The stunning, park-like setting of the OSU campus is comprised of 400 acres of stately buildings, seasonal landscaping and green, open spaces. Housing for many OSU undergraduate and graduate students is provided by residence halls on campus, and cooperatives, sororities, fraternities, and family student housing just off the central campus.

In addition to the main campus, the state owns and leases many acres of forest and farmland that are used by the university for instruction and research. OSU's Hatfield Marine Science Center at Newport serves as the main coastal facility for Sea Grant, oceanography, and fisheries programs. For many graduate students, study and research through these off-campus facilities means a direct look at the natural resources and characteristics of the Pacific Northwest.

The institution that is now OSU opened in 1858 as Corvallis College, a small academy. College-level study began about 1865, and the first three baccalaureate degrees were awarded in 1870. Graduate programs began a short time later. In 1868, Corvallis College was designated by the Oregon Legislature as the "agricultural college of the state of Oregon." From 1868 until 1885, the college continued under the direction of the Methodist Episcopal Church but was partly state supported. In 1885, the state of Oregon assumed full control of the institution.

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Oregon State granted its first advanced degree (A.M.) in 1876. Residence requirements for the master's degree were announced in 1897.

Responsibility for graduate study at OSU has changed a number of times over the years. In 1910 it was placed under a standing committee of the faculty. In 1933 all graduate work in the State System of Higher Education was placed in an interinstitutional graduate division. At Oregon State, an associate dean and an institutional graduate council were put in immediate charge of graduate study. The first doctor of philosophy degrees were conferred by Oregon State in 1935. In October 1946, the State Board of Higher Education again gave the institutions direct responsibility for their graduate programs and assigned graduate work at Oregon State to the Graduate School.

The primary aims of the Oregon State University Graduate School are to prepare students to use the disciplinary techniques necessary for the creation of new knowledge and to assist students in acquiring specialized knowledge in one or more fields. At the same time, graduate programs may provide the student with the opportunity to acquire an educational background broader than his or her specialty.

The graduate educational process is designed to help the student attain a high level of scholarship. The student is assisted in developing the skills of assimilation, interpretation, organization, evaluation, and application of knowledge. Such scholarship increases the student's breadth of learning and prepares him or her for roles of leadership and participation in the broader areas of culture and society. The ideal graduate program permits the student to specialize, but at the same time develop a broad educational base.

The communication of new knowledge is an important part of the educational process. Creating, interpreting, and communicating knowledge are related processes at OSU. The Graduate School provides opportunities for students to develop skills to carry out these processes.

GRADUATE DEGREES AND CERTIFICATES BY COLLEGE OR SCHOOL

COLLEGE OF AGRICULTURAL SCIENCES

Agricultural Education, MAG, MS
Agriculture, MAG
Animal Science, MAG, MS, PhD
Applied Economics, MA, MS, PhD
Applied Systematics in Botany, PSM
Botany and Plant Pathology, MA, MAG, MS, PhD
Crop Science, MAG, MS, PhD
Entomology, MA, MAG, MS, PhD
Fisheries Management, Graduate Certificate
Fisheries Science, MAG, MS, PhD
Fisheries and Wildlife Administration, PSM
Food Science and Technology, MAG, MS, PhD
Horticulture, MAG, MS, PhD
Rangeland Ecology and Management, MAG, MS, PhD
Soil Science, MAG, MS, PhD
Toxicology, MAG, MS, PhD
Wildlife Science, MAG, MS, PhD

COLLEGE OF BUSINESS

Business Administration, MBA, PhD
(administered by the College of Business)
Business Administration and Accountancy
(MBAA) (administered by the College of
Business)
Design and Human Environment, MA, MS,
PhD

COLLEGE OF EDUCATION

Adult Education, EdM
College Student Services Administration,
EdM, MS
Counseling, MS, PhD
Education, EdM, MS, EdD, PhD
Mathematics Education, MA, MS, PhD
Science Education, MA, MS, PhD
Teaching, MAT

COLLEGE OF EARTH, OCEAN, AND ATMOSPHERIC SCIENCES

Geographic Information Science, Graduate
Certificate
Geography, MA, MS, PhD
Geology, MA, MS, PhD
Marine Resource Management, MA, MS,
Graduate Certificate
Ocean, Earth and Atmospheric Sciences,
MA, MS, PhD
Water Conflict Management and
Transformation, Graduate Certificate

COLLEGE OF ENGINEERING

Biological and Ecological Engineering,
MEng, MS, PhD
Chemical Engineering, MEng, MS, PhD
Civil Engineering, MEng, MS, PhD
Computer Science, MA, MEng, MS, PhD
Electrical and Computer Engineering,
MEng, MS, PhD

Environmental Engineering, MEng, MS, PhD
Industrial Engineering, MEng, MS, PhD
Materials Science, MS, PhD
Mechanical Engineering, MEng, MS, PhD
Medical Physics, MMP, MS, PhD
Nuclear Engineering, MEng, MS, PhD
Radiation Health Physics, MA, MHP, MS, PhD

COLLEGE OF FORESTRY

Forest Ecosystems and Society, MF, MS, PhD
Natural Resources, MNR
Sustainable Forest Management, MF, MS, PhD
Sustainable Natural Resources, Graduate
Certificate
Wood Science, MS, PhD

COLLEGE OF LIBERAL ARTS

Applied Anthropology, MA, PhD
Applied Ethics, MA
Contemporary Hispanic Studies, MA
Creative Writing, MFA
English, MA
History of Science, MA, MS, PhD
Public Policy, MPP, PhD
Women, Gender, and Sexuality Studies, MA

COLLEGE OF PHARMACY

Pharmaceutical Sciences, MS, PhD

COLLEGE OF PUBLIC HEALTH AND HUMAN SCIENCES

Exercise and Sport Science, MS, PhD
Health Management and Policy, Graduate
Certificate
Human Development and Family Studies,
MS, PhD
Nutrition, MS, PhD
Public Health, Graduate Certificate
Public Health, MPH, PhD

COLLEGE OF SCIENCE

Applied Physics, PSM
Biochemistry and Biophysics, MA, MS, PhD
Chemistry, MA, MS, PhD
Management for Science Professionals,
Graduate Certificate
Mathematics, MA, MS, PhD
Microbiology, MA, MS, PhD
Physics, MA, MS, PhD
Statistics, MA, MS, PhD
Zoology, MA, MS, PhD

INTERDISCIPLINARY/ INSTITUTIONAL PROGRAMS

Applied Biotechnology, PSM
College and University Teaching, Graduate
Certificate
Comparative Health Sciences, MS, PhD
Environmental Sciences, MA, MS, PhD, PSM
Interdisciplinary Studies, MAIS
Molecular and Cellular Biology, MS, PhD
Water Resources Engineering, MS, PhD
Water Resources Policy and Management, MS
Water Resources Science, MS, PhD

GRADUATE MAJORS, MINORS, AND ACADEMIC UNITS

Graduate Major Note: Most graduate majors may be used as a graduate minor. Also see Graduate Minor chart for additional fields approved as graduate minors only.	Graduate Degrees	Academic Unit Note: The academic unit is responsible for directing and managing the majors and minors.	Graduate Areas of Concentration Note: Areas of concentration are for reference only. They do not appear on transcripts or diplomas.
Adult Education	EdM	College of Education	Organization development and training, work force development, workplace and adult skills development
Agricultural Education	MAG, MS	Dept. of Agricultural Education and General Agriculture	Teacher preparation, leadership and communication in agriculture
Agriculture	MAG	College of Agricultural Sciences	Three agriculturally related areas are required. Areas may be applied economics, agricultural education, animal science, botany and plant pathology, crop science, entomology, fisheries science, food science and technology, horticulture, rangeland ecology and management, soil science, toxicology, wildlife science, or other areas approved by the College of Agricultural Sciences
Animal Science	MAG, MS, PhD	Dept. of Animal and Rangeland Sciences	Animal nutrition, dairy production (MS only), embryo physiology, endocrinology, growth and development, livestock management (MS only), nutritional biochemistry, reproductive physiology
Applied Anthropology	MA, PhD	School of Language, Culture, and Society	Native Americans—past and present, biocultural medical anthropology, cultural resource management, globalization/localization, historic archaeology, language and cross-cultural communications, and natural resources and communities (MA only). Archaeology; business organization and work; ethnicity, culture and health; local values, indigenous knowledge, and environment (PhD only)
Applied Biotechnology	PSM	Graduate School	
Applied Economics	MA, MS, PhD	College of Agricultural Sciences	Resource and environmental economics, trade and development, public health economics, transportation economics (MA, MS only)
Applied Ethics	MA	School of History, Philosophy and Religion	Bioethics, environmental ethics, and art and morality
Applied Systematics in Botany	PSM	Dept. of Botany and Plant Pathology	
Applied Physics	PSM	Dept. of Physics	
Biochemistry and Biophysics	MA, MS, PhD	Dept. of Biochemistry and Biophysics	Biochemistry, biophysics
Biological and Ecological Engineering	MEng, MS, PhD	Dept. of Biological and Ecological Engineering	Bio-based products and fuels, bioprocessing, biological systems analysis, ecosystems analysis and modeling, water quality, water resources
Botany and Plant Pathology	MA, MAG, MS, PhD	Dept. of Botany and Plant Pathology	Applied systematics, ecology, genetics, genomics and computational biology, molecular and cellular biology, mycology, plant pathology, plant physiology, systemics
Business Administration	MBA, PhD	College of Business	Clean technology, commercialization, executive leadership, global operations, marketing, research thesis, wealth management
Business Administration and Accountancy	MBAA	College of Business	
Chemical Engineering	MEng, MS, PhD	School of Chemical, Biological, and Environmental Engineering	Chemical engineering
Chemistry	MA, MS, PhD	Dept. of Chemistry	Analytical chemistry, inorganic chemistry, materials chemistry, nuclear chemistry, organic chemistry, physical chemistry
Civil Engineering	MEng, MS, PhD	School of Civil and Construction Engineering	Civil engineering, coastal and ocean engineering, construction engineering management, geomatics, geotechnical engineering, infrastructure materials, structural engineering, transportation engineering, water resources engineering
College Student Services Administration	EdM, MS	College of Education	College and university characteristics and environments; history, development, and current issues in higher education; leadership and management of administrative departments; program oversight in specialized administrative areas such as financial aid, student activities, career services, multicultural affairs, recreational sports, and student housing; student development theory and application
Comparative Health Sciences	MS, PhD	Graduate School	
Computer Science	MA, MEng, MS, PhD	School of Electrical Engineering and Computer Science	Algorithms and cryptography, artificial intelligence and machine learning; computer systems and networking; human-computer interaction; programming languages; software engineering
Contemporary Hispanic Studies	MA	School of Language, Culture, and Society	Contemporary Hispanic studies
Counseling	MS, PhD	College of Education	Clinical mental health counseling (MS only), counseling (PhD only), school counseling (MS only)
Creative Writing	MFA	School of Writing, Literature, and Film	Fiction, poetry, and nonfiction writing
Crop Science	MAG, MS, PhD	Dept. of Crop and Soil Science	Crop breeding, genetics and cytogenetics (cereals, oilseeds, potatoes), forage and pasture management, grain crop production, post-harvest seed technology, seed biology, seed crop physiology, seed production, weed biology, weed management

Graduate Major <i>Note:</i> Most graduate majors may be used as a graduate minor. Also see Graduate Minor chart for additional fields approved as graduate minors only.	Graduate Degrees	Academic Unit <i>Note:</i> The academic unit is responsible for directing and managing the majors and minors.	Graduate Areas of Concentration <i>Note:</i> Areas of concentration are for reference only. They do not appear on transcripts or diplomas.
Design and Human Environment	MA, MS, PhD	School of Design and Human Environment, College of Business	Cultural/historic aspects of the near environment, design in the near environment, human behavior in the near environment, merchandising management, and textiles
Education	EdM, MS, EdD, PhD	College of Education	Community college leadership (EdD, PhD); Elementary, middle, and secondary education (EdM)
Electrical and Computer Engineering	MEng, MS, PhD	School of Electrical Engineering and Computer Science	Analog and mixed signal; artificial intelligence and machine learning; communications and signal processing; computer systems; energy systems; materials and devices; RF/microwaves
English	MA	School of Writing, Literature, and Film	Literature and culture; or rhetoric, writing, and culture
Entomology	MA, MAg, MS, PhD	Entomology Program (College of Agricultural Sciences)	Entomology
Environmental Engineering	MEng, MS, PhD	School of Chemical, Biological, and Environmental Engineering	Bioremediation, environmental fluid mechanics, environmental microbiology, environmental modeling, multiphase phenomena, subsurface flow and transport, water and wastewater treatment
Environmental Sciences	MA, MS, PhD, PSM	Graduate School	Biogeochemistry, ecology, environmental education, natural resources, quantitative analysis, social science, water resources
Exercise and Sport Science	MS, PhD	School of Biological and Population Health Sciences	Exercise physiology, movement studies in disability, neuromechanics, physical activity and public health, sport and exercise psychology, sport pedagogy
Fisheries and Wildlife Administration	PSM	Dept. of Fisheries and Wildlife	
Fisheries Science	MAg, MS, PhD	Dept. of Fisheries and Wildlife	Aquaculture, conservation biology, fish genetics, ichthyology, limnology, parasites and diseases, physiology and ecology of marine and freshwater fishes, stream ecology, toxicology, water pollution biology
Food Science and Technology	MAg, MS, PhD	Dept. of Food Science and Technology	Brewing, enology, flavor chemistry, food chemistry/biochemistry, food engineering, food microbiology/biotechnology, food and seafood processing, sensory evaluation
Forest Ecosystems and Society	MF, MS, PhD	Dept. of Forest Ecosystems and Society	Forest biology (MF only); forest, wildlife and landscape ecology; genetics and physiology; integrated social and ecological systems; silviculture (MF only); science of conservation, restoration and sustainable management; social science, policy, and natural resources; soil-plant-atmosphere continuum; sustainable recreation and tourism
Geography	MA, MS, PhD	College of Earth, Ocean, and Atmospheric Sciences	Geographic information science, physical geography, resource geography
Geology	MA, MS, PhD	College of Earth, Ocean, and Atmospheric Sciences	Solid Earth processes and history: Volcanology, igneous petrology and economic geology Active tectonics and earthquake geology Surface Earth processes and history: Earth system history Hydrogeology and hydrology Geomorphology and surface processes Climate and biogeochemical cycles
History of Science	MA, MS, PhD	School of History, Philosophy, and Religion	Development of the physical, biological, and environmental sciences; history of science and medicine; intellectual and social history of science in Europe and the U.S.
Horticulture	MAg, MS, PhD	Dept. of Horticulture	Breeding, genetics and biotechnology; community and landscape horticultural systems; sustainable crop production
Human Development and Family Studies	MS, PhD	School of Social and Behavioral Health Sciences	Human development and family studies
Industrial Engineering	MEng, MS, PhD	School of Mechanical, Industrial and Manufacturing Engineering	Human systems engineering, information systems engineering, manufacturing systems engineering, nano/micro fabrication
Interdisciplinary Studies	MAIS	Graduate School	Selected from three fields offering graduate majors or minors
Marine Resource Management	MA, MS	College of Earth, Ocean, and Atmospheric Sciences	Marine resource management
Materials Science	MS, PhD	Material Science Program (School of Mechanical, Industrial and Manufacturing Engineering-Coord Unit)	Materials science-chemistry, chemical engineering, civil engineering, electrical and computer engineering, forest products, mathematics, mechanical engineering, nuclear engineering, physics
Mathematics	MA, MS, PhD	Dept. of Mathematics	Actuarial science, algebra, analysis, applied mathematics, computational mathematics, differential equations, financial mathematics, geometry, mathematics education, number theory, numerical analysis, probability, topology
Mathematics Education	MA, MS, PhD	College of Education	Elementary school mathematics, free-choice learning, mathematics education, middle school mathematics, secondary mathematics
Mechanical Engineering	MEng, MS, PhD	School of Mechanical, Industrial and Manufacturing Engineering	Applied mechanics, applied thermodynamics, biomechanics, combustion, design, design and analysis of mechanical and thermal fluid systems, dynamics, energy, fluid mechanics, heat transfer, materials science, mechanical engineering, physical and mechanical metallurgy, solid mechanics, stress analysis, systems and control

Graduate Major <i>Note:</i> Most graduate majors may be used as a graduate minor. Also see Graduate Minor chart for additional fields approved as graduate minors only.	Graduate Degrees	Academic Unit <i>Note:</i> The academic unit is responsible for directing and managing the majors and minors.	Graduate Areas of Concentration <i>Note:</i> Areas of concentration are for reference only. They do not appear on transcripts or diplomas.
Medical Physics	MMP, MS, PhD	Dept. of Nuclear Engineering and Radiation Health Physics	Medical health physics, therapeutic radiologic physics
Microbiology	MA, MS, PhD	Dept. of Microbiology	Environmental microbiology, food microbiology, genomics, immunology, microbial ecology, microbial evolution, parasitology, pathogenic microbiology, virology
Molecular and Cellular Biology	MS, PhD	Graduate School	Bioinformatics, biotechnology, cell biology, developmental biology, genome biology, molecular biology, molecular pathogenesis, molecular virology, plant molecular biology, structural biology
Natural Resources	MNR	College of Forestry	Fisheries Management, Geographic Information Science (GIScience), Marine Resources Management, Sustainable Natural Resources, Water Conflict Management and Transformation
Nuclear Engineering	MEng, MS, PhD	Dept. of Nuclear Engineering and Radiation Health Physics	Application of nuclear techniques, arms control technology, nuclear instrumentation and applications, nuclear medicine, nuclear power generation, nuclear reactor engineering, nuclear systems design and modeling, nuclear waste management, numerical methods for reactor analysis, radiation shielding, radioisotope production, space nuclear power, and thermal hydraulics
Nutrition	MS, PhD	School of Biological and Population Health Sciences	Nutrition
Ocean, Earth and Atmospheric Sciences	MA, MS, PhD	College of Earth, Ocean, and Atmospheric Sciences	Atmospheric sciences, geophysics, biological oceanography, chemical oceanography, geological oceanography, physical oceanography
Pharmaceutical Sciences	MS, PhD	College of Pharmacy	Biopharmaceutics, medicinal chemistry, natural products chemistry, pharmaceuticals, pharmacokinetics, pharmacology, pharmacoconomics, toxicology
Physics	MA, MS, PhD	Dept. of Physics	Atomic physics, computational physics, nuclear physics, optical physics, particle physics, relativity, solid state physics, physics education
Public Health	MPH, PhD	College of Public Health and Human Sciences	Biostatistics (MPH only); environmental and occupational health and safety (MPH, PhD); epidemiology (MPH only); health management and policy (MPH only); health policy (PhD only); health promotion and health behavior (MPH, PhD); international health (MPH only)
Public Policy	MPP, PhD	College of Liberal Arts, School of Public Policy	Environmental policy, international policy, rural policy, science policy, social policy
Radiation Health Physics	MA, MHP, MS, PhD	Dept. of Nuclear Engineering and Radiation Health Physics	Application of nuclear techniques, boron neutron capture therapy, emergency response planning, environmental monitoring, environmental pathways assessment, nuclear medicine, radiation detection and instrumentation, radiation dosimetry, radiation health physics, radiation shielding, radioactive material transport, radioactive waste management, research reactor health physics, and risk assessment
Rangeland Ecology and Management	MAG, MS, PhD	Dept. of Animal and Rangeland Sciences	Agroforestry, ecology of rangelands, physiology of range plants, range improvement, range nutrition, restoration ecology, riparian zone management, watershed management
Science Education	MA, MS, PhD	College of Education	Elementary school science, free-choice learning, middle school science, science education, secondary science
Soil Science	MAG, MS, PhD	Dept. of Crop and Soil Science	Environmental soil science, forest soils, nutrient cycling, soil conservation and land use, soil fertility and plant nutrition, soil genesis and classification, soil geochemistry, soil microbiology, soil physics
Statistics	MA, MS, PhD	Dept. of Statistics	Statistics
Sustainable Forest Management	MF, MS, PhD	Department of Forest Engineering, Resources and Management	Engineering for sustainable forestry; forest biometrics and geomatics; forest operations planning and management; forest policy analysis and management; forest watershed management; silviculture, fire, and forest health
Teaching	MAT	College of Education	Teaching*
Toxicology	MAG, MS, PhD	Dept. of Environmental and Molecular Toxicology	Environmental chemistry and ecotoxicology, mechanistic toxicology, molecular and cellular toxicology, neurotoxicology
Water Resources Engineering	MS, PhD	Graduate School	Groundwater engineering, surface water engineering, watershed engineering
Water Resources Policy and Management	MS	Graduate School	Water resources policy and management
Water Resources Science	MS, PhD	Graduate School	Water resources science
Wildlife Science	MAG, MS, PhD	Dept. of Fisheries and Wildlife	Animal-habitat relationships; behavior; biology of big game and small mammals; conservation biology; community studies; ecology of avian and mammalian predators; ecology of waterfowl and upland gamebirds; effects of parasites, diseases, and environmental contaminants; nutrition; population; population dynamics; reproductive biology; toxicology of pesticides; wildlife ecology; wildlife-forestry interactions; wildlife science
Women, Gender, and Sexuality Studies	MA	School of Language, Culture, and Society	Contemporary women's issues; leadership and community engagement; race, class and gender; sexuality studies; transnational perspectives

Graduate Major <i>Note:</i> Most graduate majors may be used as a graduate minor. Also see Graduate Minor chart for additional fields approved as graduate minors only.	Graduate Degrees	Academic Unit <i>Note:</i> The academic unit is responsible for directing and managing the majors and minors.	Graduate Areas of Concentration <i>Note:</i> Areas of concentration are for reference only. They do not appear on transcripts or diplomas.
Wood Science	MS, PhD	Dept. of Wood Science and Engineering	Biodeterioration and materials protection, chemistry and chemical processing, forest products business and marketing, physics and moisture relations, process modeling and analysis, renewable materials science and engineered composites, wood anatomy and quality, wood engineering and mechanics
Zoology	MA, MS, PhD	Dept. of Zoology	Behavioral ecology, behavioral endocrinology, cell biology, chemical ecology, conservation biology, developmental biology, evolutionary biology, genetics, genomics, host-microbe interactions, marine ecology, paleontology, physiology, population biology

GRADUATE MINORS THAT DO NOT HAVE CORRESPONDING MAJORS, AND ACADEMIC UNITS

(Also see Graduate Major chart for other fields that may be utilized as a graduate minor)

Minor	Academic Unit	Graduate Areas of Concentration
Aging Science	School of Social and Behavioral Health Sciences	
Anthropology	School of Language, Culture, and Society	Applied cultural anthropology, biocultural evolution, cultural resource management, cross-cultural communication, general anthropology, historic archeology, medical anthropology, natural resource and community development, prehistoric archeology
Art	School of Arts and Communication	Art history, fine arts, photography
Community College Education	College of Education	Instruction, curriculum, management and adult extension, community college
Ecosystem Informatics	College of Earth, Ocean, and Atmospheric Sciences	Ecosystem informatics
Ethnic Studies	School of Language, Culture, and Society	Ethnic studies
Food in Culture and Social Justice	School of Language, Culture, and Society	
Foreign Languages and Literatures	School of Language, Culture, and Society	Modern languages, French, German, Spanish
Gerontology	School of Social and Behavioral Health Sciences	Gerontology
History	School of History, Philosophy, and Religion	American history (U.S.), Western U.S. history, European history, non-American and non-European history (Asian, African, Latin American, Islamic), history of science
International Agricultural Development	College of Agricultural Sciences	International agricultural development
Music	School of Arts and Communication	Composition, Conducting, music education, performance
Philosophy	School of History, Philosophy, and Religion	Ethics (including environmental ethics and biomedical ethics), logic and philosophy of science, aesthetic theory, history of philosophy, religious studies
Political Science	School of Public Policy	American politics, judicial politics, public administration, political theory, state and local government, international relations, comparative politics, gender politics, environmental policy
Psychology	School of Psychological Sciences	General psychology
Rural Studies	Graduate School	Rural studies
Sociology	School of Public Policy	Environmental and natural resources, international sociology, social policy
Speech Communication	School of Arts and Communication	Interpersonal and group communication; rhetoric and social influence; theatre arts costume and scene design; theatre arts directing, performance, and management; theatre arts history, criticism/literature, and playwriting
Water Conflict Management and Transformation	College of Earth, Ocean, and Atmospheric Sciences	Water conflict management and transformation
Water Resources	Center for Water and Environmental Sustainability (Coordinating Unit)	Hydrology, water quality, water resources planning and management

In addition to the minors listed above, most departments or schools offering a graduate major may also offer a graduate minor.

GRADUATE CERTIFICATES

Graduate Certificate	Academic Unit
College and University Teaching	Graduate School
Fisheries Management	Dept. of Fisheries and Wildlife, College of Agricultural Sciences
Geographic Information Science	College of Earth, Ocean, and Atmospheric Sciences
Health Management and Policy	College of Public Health and Human Sciences
Management for Science Professionals	College of Science
Marine Resource Management	College of Earth, Ocean, and Atmospheric Sciences
Public Health	College of Public Health and Human Sciences
Sustainable Natural Resources	College of Forestry; Dept. of Forest Ecosystems and Society
Water Conflict Management and Transformation	College of Earth, Ocean, and Atmospheric Sciences
Wildlife Management	Dept. of Fisheries and Wildlife, College of Agricultural Sciences

GRADUATE OPTIONS

Graduate Option	Graduate Major	Academic Unit
Accounting	Business Administration (PhD)	College of Business
Biomedical Sciences	Comparative Health Sciences	College of Veterinary Medicine
Clinical Mental Health Counseling	Counseling	College of Education
Commercialization	Business Administration (MBA)	College of Business
Design	Mechanical Engineering	School of Mechanical, Industrial, and Manufacturing Engineering
Engineering Management	Industrial Engineering	School of Mechanical, Industrial, and Manufacturing Engineering
Entomology	<ul style="list-style-type: none"> • Horticulture • Crop Science 	<ul style="list-style-type: none"> • Department of Horticulture • Department of Crop and Soil Science
Global Operations	Business Administration (MBA)	College of Business
Innovation/Commercialization	Business Administration (PhD)	College of Business
Marketing	Business Administration (MBA)	College of Business
Materials Mechanics	Mechanical Engineering	School of Mechanical, Industrial, and Manufacturing Engineering
Plant Breeding and Genetics	<ul style="list-style-type: none"> • Horticulture • Crop Science 	<ul style="list-style-type: none"> • Department of Horticulture • Department of Crop and Soil Science
Robotics	Mechanical Engineering	School of Mechanical, Industrial, and Manufacturing Engineering
School Counseling	Counseling	College of Education
Research Thesis	Business Administration (MBA)	College of Business
Thermal Fluid Sciences	Mechanical Engineering	School of Mechanical, Industrial, and Manufacturing Engineering
Wealth Management	Business Administration (MBA)	College of Business
Graduate Options Pending Approval	Graduate Major	Academic Unit
Clinical Sciences	Comparative Health Sciences	College of Veterinary Medicine
Energy Conversion	Mechanical Engineering	College of Engineering
English for Speakers of Other Languages	Education	College of Education
Executive Leadership	Business Administration (MBA)	College of Business
Renewable Energy	Mechanical Engineering	College of Engineering

*PROFESSIONAL TEACHER LICENSES

CONTENT AREAS FOR THE MASTER OF ARTS IN TEACHING DEGREE

(Not available for use as a graduate minor)

Advanced Mathematics Education
 Agricultural Education
 Biology Education
 Chemistry Education
 Elementary Education
 Family and Consumer Sciences Education
 Integrated Science Education
 Language Arts Education—
 Cascades campus only
 Music Education
 Physics Education
 Spanish Education

MISSION, GOALS, AND VALUES

Preamble

Oregon State University is a comprehensive, public, research-intensive university and a member of the Oregon University System serving as the state's land, sea, space and sun grant institution—one of only two universities with such designation in the country (Cornell University in Ithaca, NY, is the other). OSU programs and faculty are located in every county of the state and are dedicated to investigating the state's greatest challenges. OSU considers the state of Oregon its campus and works in partnership with the P-12 school system, Oregon community colleges and other OUS institutions to provide access to high quality educational programs. Strong collaborations with industry and state and federal agencies drive OSU's research enterprise.

MISSION

As a land grant institution committed to teaching, research, and outreach and engagement, Oregon State University promotes economic, social, cultural and environmental progress for the people of Oregon, the nation and the world. This mission is achieved by producing graduates competitive in the global economy, supporting a continuous search for new knowledge and solutions, and maintaining a rigorous focus on academic excellence, particularly in the three Signature Areas: Advancing the Science of Sustainable Earth Ecosystems; Improving Human Health and Wellness; and Promoting Economic Growth and Social Progress.

VISION

To best serve the people of Oregon, Oregon State University will be among the Top 10 land grant institutions in America.

GOALS

1. Provide outstanding academic programs that further strengthen our performance and pre-eminence in three Signature Areas of Distinction:

Advancing the Science of Sustainable Earth Ecosystems; Improving Human Health and Wellness; and Promoting Economic Growth and Social Progress.

2. Provide an excellent teaching and learning environment and achieve student access, persistence, and success through graduation and beyond that matches the best land grant universities in the country.
3. Substantially increase revenues from private fundraising, partnerships, research grants, and technology transfers while strengthening our ability to more effectively invest and allocate resources to achieve success.

OSU Strategic Plan: <http://oregonstate.edu/leadership/strategicplan/>

CORE VALUES

Accountability. We are committed stewards of the loyalty and good will of our alumni and friends of the human, fiscal, and physical resources entrusted to us.

Diversity. We recognize that diversity and excellence go hand-in-hand, enhancing our teaching, scholarship, and service as well as our ability to welcome, respect, and interact with other people.

Integrity. We practice honesty, freedom, truth, and integrity in all that we do.

Respect. We treat each other with civility, dignity, and respect.

Social responsibility. We contribute to society's intellectual, cultural, spiritual, and economic progress and well-being to the maximum possible extent.

ORGANIZATION

Graduate School

Graduate work at Oregon State University is administered by the Graduate School. The regulations, policies, and procedures governing graduate education are implemented by the dean of the Graduate School. The dean coordinates graduate programs, courses, admission standards, and certificate and degree requirements; enforces current regulations; recommends changes in graduate policy to the Graduate Council; acts on petitions to deviate from existing regulations; and is responsible for the efficient and effective operation of the Graduate School. The Graduate School office is in room A300 of OSU's Kerr Administration Building. The telephone number is 541-737-4881, and the FAX number is 541-737-3313. The email address is Graduate.School@oregonstate.edu, and the Web address is <http://gradschool.oregonstate.edu>.

Mission

The Graduate School contributes to OSU's goal of achieving top ten land

grant status by providing leadership in all aspects of graduate education, through advocacy for the critical importance of the graduate enterprise to the university's mission, and by providing core centralized services to the graduate community. In partnership with the graduate faculty, the Graduate School plays a leadership and advocacy role to ensure that OSU attracts the best graduate students and delivers a compelling and high-quality graduate experience that prepares them to create new ideas and knowledge, to educate others, to make positive impacts on society, and to lead innovation.

GRADUATE COUNCIL

The Graduate Council formulates the basic policy, procedures, and requirements for all graduate work at OSU, within the general authority granted by the State Board of Higher Education. The council establishes admission standards, basic degree requirements, and general policies; approves all graduate faculty members, new programs, and courses; and periodically reviews all existing graduate programs. Graduate Council members are appointed by the Executive Committee of the Faculty Senate, with each academic college having one representative. Major actions of the Graduate Council are referred to the Faculty Senate for review and approval.

Graduate Council Membership

Jim Coakley, Chair 2013, Business
 Murray Levine, 2013, Earth, Ocean, and Atmospheric Sciences
 Stacy Semevolos, 2013, Veterinary Medicine
 Mike Lerner, 2014, Science
 Andrew Plantinga, 2014, Agricultural Sciences
 Darrell Ross, 2014, Forestry
 Theresa Filtz, 2014, Pharmacy
 Jay Casbon, 2015, OSU-Cascades/Education
 Don Jump, 2015, Public Health and Human Sciences
 Janet Lee, 2015, Liberal Arts
 Greg Herman, 2015, Engineering
 Student Member - TBA

Ex-officios:

- Graduate School Dean Brenda McComb
- Graduate School Associate Dean Anita Azarenko
- Graduate Admissions Committee Chair Wade Marcum
- Executive Committee Liaison Andrew Karplus

Graduate Council Representation:

Distance Education Committee

Past and present membership: <http://oregonstate.edu/senate/committees/gradcncl/member/>

GRADUATE FACULTY

Graduate faculty members are chosen from the university faculty based on their academic training, experience, dem-

onstrated potential for scholarship, and evidence of their ability and competency to direct and supervise graduate students in the pursuit of advanced knowledge.

Each graduate faculty member is authorized to perform specific activities within a particular graduate program. The head and academic dean of each unit are responsible for nominating faculty members for these activities, subject to review and approval by the Graduate Council.

ACADEMIC UNITS

An academic unit is the administrative unit responsible for directing and managing a graduate major or minor field of study. An academic unit may be an academic program, department, school, or college, or composite of these. The chief administrative officer of the academic unit is responsible for managing the graduate programs in that unit and is responsible to the dean of the Graduate School for all graduate work performed by the unit.

Academic units have a major role in the success of graduate education. Within the general rules of the Graduate School, the academic units establish and teach courses, maintain a graduate faculty to teach and supervise research, establish their own admission standards and specific graduate certificate and degree requirements, make graduate student appointments, and provide advice and supervision for their graduate students.

GRADUATE ADMISSIONS REQUIREMENTS

Oregon State University offers admission to applicants whose records demonstrate the highest potential for graduate study and promise for substantial contribution to both their academic professions and to a diverse, global society. The university fosters an environment that welcomes inclusiveness.

Admission decisions are based on many factors, such as the quality of the applicant's prior academic degree and record of accomplishment, statement of purpose, letters of recommendation from professors or others familiar with the applicant's academic work, performance in aptitude and achievement tests, relevant work experience, preparation in the proposed field of study, and the connection of the applicant's academic goals with the faculty's research interests.

Requirements

The following minimum entrance requirements guide the university and its graduate programs in the consideration of applicants for graduate admission:

- A four-year baccalaureate degree (or international equivalent), a professional degree (such as

BPharm, BVsc, MBBS, MD, DVM, DPharm, etc.), or an appropriate U.S./Canadian alternative degree, from a regionally accredited (US) or recognized (International) college or university, **with**

- A cumulative B average (equivalent 3.00 on a U.S. 4.00 grading scale) on the most recent baccalaureate degree or equivalent or any subsequent graduate degree from a regionally accredited (US) or recognized (International) college or university, plus all work completed thereafter.

The graduate program may choose to calculate the GPA on the last 90 quarter credits (60 semester credits [last two years on an international record]) of graded undergraduate work on the most recent baccalaureate degree, plus all work completed thereafter, as the basis for admission.

Minimum GPA for admission to *only* graduate certificate programs is set by the departments that supervise the certificates. Applicants requesting admission to only graduate certificate programs should contact their academic program to learn about minimum GPA and other admission requirements.

OR:

- A four-year baccalaureate degree (or international equivalent), a professional degree, or an appropriate U.S./Canadian alternative degree, from a regionally accredited (US) or recognized (International) college or university, **and**
- A 45-quarter credit equivalent graduate degree from a regionally accredited (US) or recognized (International) college or university, **with**
- A cumulative B average (equivalent 3.00 on a U.S. 4.00 grading scale) on the most recent graduate degree.

If the applicant has completed his or her baccalaureate degree in a country that is a signatory of the Bologna Declaration, then:

- A Bologna compliant baccalaureate degree at a recognized college or university of at least three years duration, **with**
- A cumulative B average (equivalent 3.00 on a U.S. 4.00 grading scale) on the degree, plus all subsequent graded course work.

OR (Other three-year bachelor degree holders):

- A non-Bologna compliant baccalaureate degree of at least three years duration from a recognized college or university, **and**
- A 45-quarter credit equivalent graduate degree from a recognized college or university, **with**
- A cumulative GPA of at least 3.00 on the most recent graduate degree.

INTERNATIONAL REQUIREMENTS

All international graduate applicants must meet the following additional requirements:

- Documentation of sufficient financial resources to attend Oregon State University as a graduate student.
- AND:**
- Documentation of English language proficiency

Graduate Applicants		
	Regular Admission	Transitional Admission-TAP (formerly Conditional Admission-CAP)
TOEFL Paper based	550	500–547
Internet (iBT) TOEFL	80 Minimum score of 18 on each section	60–79 Or any sub-score less than 18
Internet (iBT) TOEFL Applicants awarded GTA	80 Minimum score of 22 on Speaking sub-score and Minimum score of 18 on all other sections	
IELTS	6.5	6.0

Please note: OSU requires graduate applicants to meet or exceed all five iBT scores to be eligible for full admission. Scores must be no more than two years old at the time of the applicant's first term of registration.

Waived from English Language Testing:

The English language proficiency requirement is waived for applicants who have demonstrated success by achieving an overall GPA greater than 3.0 on a 4.0 scale for two or more semesters/quarters in a rigorous undergraduate or postgraduate program in the U.S. or from one of the following English speaking countries**: Australia, Canada, New Zealand, and United Kingdom.

** Waivers for applicants in other countries are considered on a case-by-case basis if the medium of instruction is English. The individual program must petition the Graduate School for a waiver. Not all programs will request a waiver. Please contact your proposed graduate program to inquire about their policy.

English Language Exceptions:

Individual programs may request exceptions to the minimum English language proficiency requirements. Exceptions to the minimum TOEFL score/sub-score requirements will be considered by the Graduate School Dean on request if:

- Applicant's GRE Verbal score is greater than 500 (153 – revised GRE)
- OR**
- The chair of the Graduate Program (or designated faculty member)
 - Has personally interviewed the applicant and established a plan for language support for the applicant, if needed, which may include additional English Language Training,
 - OR**
 - The Graduate Program arranges for the applicant to complete language training at INTO OSU equivalent to the admission status as designated by the Transitional Admission Program-TAP

TRANSITIONAL ENGLISH ADMISSION

Transitional admission based on English language proficiency may be granted to applicants seeking admission to a graduate degree program. University transitional admission of international applicants may be granted only if the applicant is otherwise fully admissible.

Transitional admission for degree-seeking applicants requires:

- On-campus testing of English language proficiency prior to enrollment, and
- Compliance with the subsequently specified plan for English and academic course work during each quarter until such time as the applicant qualifies for regular admission.
- Individual graduate programs may require additional documents such as GRE and GMAT test results or set higher English and academic standards. For detailed information, refer to the website for Graduate Admissions and individual graduate programs websites.

Transitional admission based on English language proficiency may not be granted to applicants seeking admission to *only* a graduate certificate program.

All international applicants seeking graduate teaching assistantships should refer to the International Graduate Teaching Assistant English Language Requirement section of this catalog for more details.

ADMISSION REQUIREMENTS CONTINUED

Applicants not meeting minimum academic requirements still may be considered for admission with the support of their academic program, plus review and approval by the University Graduate Admissions Committee. For these applicants, decisions may rely more heavily on noncognitive criteria. However, the university encourages those applicants

whose overall cumulative undergraduate GPA of less than an equivalent 3.00 on a U.S. 4.00 grading scale to take the GRE.

Applicants whose baccalaureate degrees are awarded by an institution that issues non-graded transcripts will be considered for admission with the support of the program's written evaluation of the quality of the applicant's transcript record.

Satisfaction of minimum entrance requirements does not guarantee admission, since the number of qualified applicants far exceeds the number of places available. As a consequence, many well-qualified applicants may not be accommodated.

Please note that academic performance is not the sole criterion for admission to the university. The university may evaluate a person's behavior and background to determine their ability to maintain the standards of academic and professional conduct expected at the university. An evaluation may take into consideration current behavior and performance as well as past experiences and actions.

APPLICATION PROCESS

Application forms required for admission to the Graduate School are available electronically.

The applicant's proposed academic program will examine material submitted to determine the adequacy of scholastic background and to decide whether departmental facilities are adequate for the expressed aims of the applicant. Upon the positive recommendation of the academic program, the Graduate School will determine whether minimum university requirements for admission have been met and, subsequently, will provide to the applicant formal notification as to the action taken.

Applicants must submit application materials to the Graduate School, unless a program specifies differently. Applicants should contact their academic program(s) of interest to determine whether additional admission materials are required beyond those listed below. Applicants seeking admission to only a graduate certificate program must provide items a., b., and c. below to the Graduate School and contact their academic programs to determine what other program-specific materials may be required for admission to the graduate certificate program.

- a. One electronic version of the graduate application for each major to which the applicant seeks admission.
- b. \$60 nonrefundable application fee. Applying online requires payment by credit card.
- c. Transcripts/Academic Records* of all previous academic work,

undergraduate and graduate. International applicants must provide a certified English translation of academic records in addition to original language records.

*Unofficial records but not grade slips/reports, computer printouts, or internal transcripts may be submitted for evaluation and admission purposes.

If admitted, before registering for courses:

1. Applicants from U.S. schools must provide official transcripts from all colleges attended, including final transcripts showing degrees awarded and dates earned.
2. International applicants must provide equivalent documentation from all colleges attended, including final academic records showing degrees awarded and dates earned in the original language plus certified English translations.
- d. Three letters of professional reference are required of most applicants applying for admission to a graduate degree program.

If you have a master's degree, please include a letter from your major professor. Applicants applying only to graduate certificate programs are encouraged to consult with their academic program to determine whether this or other materials are required.

1. Non-Engineering applicants:

An optional online letter of reference system is available within the university application. If you choose to not use the letter of reference system, please ask your letter writers to mail confidential letters to the Graduate School. Reference letters should be written on official letterhead and received by the Graduate School in sealed envelopes.

2. Engineering applicants:

Use of an online letter of reference is required. The engineering online letter of reference system is available within the online departmental supplemental engineering application.

- e. Certain graduate programs require the GRE of all applicants. Address inquiries regarding GRE requirements to your proposed academic program. See specific Program Information

International applicants must also send the following documents with their application materials:

- a. One photocopy of TOEFL or IELTS scores. If admitted, official test scores must be received by the Graduate

School prior to the **start** of the applicant's first term of enrollment.

- b. Certification of Finances form with supporting documentation, demonstrating sufficient financial resources for the desired academic program. Financial documentation is not required at the time of application. If the application is accepted, the Graduate School will contact the applicant via email to request the financial materials.

Note: If you will be taking courses as a distance student through OSU Extended Campus and not entering the U.S., we ask that you complete a special certification form. Proof of funding is not required. Please contact graduate admissions to request the form.

APPLICATION DEADLINES

Department Deadlines

Academic programs establish their own application deadlines, which are often substantially earlier than the general university deadlines described below. In such cases, program deadlines supersede the more general university deadline. Some academic programs also admit applicants for specific terms only (e.g. fall term). Applicants should contact the proposed graduate program for deadlines and any other restrictions. See specific Program Information.

In the absence of earlier program deadlines, the following university deadlines exist:

U.S. Citizens and Permanent Residents

Absolutely no later than 30 days prior to the first day of classes.

International Applicants

To allow adequate time for students to obtain visas and make travel arrangements, the following deadlines have been established for international applicants:

Term	General University Deadline* for International Students Applying from Outside the U.S. * Program deadlines supersede this deadline. Please contact program directly for specific program deadline.	General University Deadline* for International Students Applying from Within the U.S. * Program deadlines supersede this deadline. Please contact program directly for specific program deadline.
Fall	April 1	June 1
Winter	July 1	September 1
Spring	October 1	December 1
Summer	January 1	March 1

SUMMER SESSION ADMISSION

See the Special Campus Programs section of this catalog and see Summer Session.

ADMISSION STATUS

Students may be admitted to the Graduate School under the following categories.

ADVANCED-DEGREE STUDENTS

1. Regularly Admitted Graduate Students. These students have been accepted by the university and by a major program to work toward an advanced degree.

2. Conditionally Admitted Graduate Students. Students who have not met the formal admission requirements but whose accomplishments have convinced the University Graduate Admissions Committee and their major program that they have potential for success as advanced degree candidates may be conditionally admitted as follows:

1. Students from nonaccredited institutions must complete at least one term of satisfactory work at Oregon State, after which they may be admitted with full standing in the Graduate School.
2. Students whose preparation does not warrant full admission to the Graduate School but who may prove acceptable later must satisfactorily complete specified conditions to demonstrate their ability to carry out graduate-level work.

3. Transitionally Admitted Graduate Students. International students who lack minimum English language proficiencies but otherwise meet all other formal admission requirements may be transitionally admitted under the following:

1. TOEFL total score is in the range of 61 to 79 (iBT).
2. IELTS total score is 6.0. Students who score below the minimum on one or more iBT subtests but meet the minimum overall iBT score requirement may be considered for transitional admission. Transitional admission based on English language proficiency may not be granted to students seeking admission to only a graduate certificate program.

4. Provisionally Admitted Graduate Students. Students who have met all of the university standards for formal admission but whose academic program or major department may have placed additional restrictions upon their admission may be provisionally admitted. These restrictions may include certain prerequisite courses that must be completed, completion

of the GRE or GMAT, submission of additional reference letters or scores, etc.

Conditionally and Transitionally admitted student cannot schedule and hold preliminary oral exams or final oral exams for their degree until they have satisfied the requirements of their admission and have been reclassified as regular graduate students.

Provisionally admitted students cannot take the final exam for their degree until they have satisfied their provisions and have been reclassified as regular graduate students.

Credit for graduate courses that students have completed acceptably while registered as conditional, transitional or provisional students may count toward the residence requirement for advanced degrees.

If students fail to satisfactorily complete their conditions or provisions, they will be dismissed from the Graduate School.

GRADUATE CERTIFICATE STUDENTS

Students admitted to *only* a graduate certificate program may be considered for reclassification as degree-seeking graduate students by following the procedure in the section below regarding reclassification.

NONDEGREE-SEEKING GRADUATE STUDENTS

The nondegree-seeking graduate student category may be used by holders of a baccalaureate degree who do not wish to pursue an advanced degree at Oregon State University. Those nondegree-seeking graduate students who wish to be reclassified as degree-seeking graduate students must follow the procedure in the next section.

International students who are currently in the U.S. on visas such as an F-1, F-2, B-2, J-1, etc. should consult with OSU's International Student Advising and Services (ISAS) (email: isas.advisor@oregonstate.edu) before submitting the OSU non-degree application for admission. Only certain visa types allow an individual to pursue part-time or non-degree-seeking course work and still maintain one's visa status.

Graduate international students who wish to enroll as nondegree students with OSU for one or more terms, but who will not participate in an established exchange program, should contact the ISAS Office isas.advisor@oregonstate.edu for further information, and before applying.

International students who plan to enroll with OSU as nondegree exchange students should use the application form that is made available at each partner institution. For a list of exchange partner

institutions, go to <http://oregonstate.edu/international/atosu/students/prospective/exchange>.

RECLASSIFICATION OF POSTBACCALAUREATE STUDENTS, NONDEGREE-SEEKING STUDENTS, AND GRADUATE CERTIFICATE STUDENTS

A postbaccalaureate, nondegree-seeking graduate, or graduate certificate student may be considered for status as a regular degree-seeking graduate student under one of the following provisions, depending upon prior academic records:

If the student would have been eligible for graduate admission at the time of entering as a postbaccalaureate, nondegree-seeking graduate, or graduate certificate student, the student is eligible for admission consideration at any time but must submit an application for admission to the appropriate level to begin the process.

If the student, prior to entering as a postbaccalaureate, nondegree-seeking graduate, or graduate certificate student had been denied graduate admission or would have been ineligible for graduate admission, as determined *a posteriori* by the University Graduate Admissions Committee, the postbaccalaureate, nondegree-seeking graduate, or graduate certificate student must complete option A or option B below and reapply or reactivate an application for admission to graduate-level study:

- a. complete 24 credits of courses each with a grade of B (3.00) or better, or
- b. complete sufficient credits to bring the cumulative grade-point average (that for the last 90 credits of undergraduate work plus that for courses taken as part of the 24-credit rule) to 3.00 or better before being eligible to apply for graduate admission.

These courses will normally be regular graduate courses relevant to the specific field, except that seminars and other blanket number graduate courses may not be used. Upper-division undergraduate courses are acceptable, provided that they eliminate specific deficiencies in requirements for entry into an identified graduate program. Lower-division undergraduate courses may not be used. All courses should be carefully selected in consultation with an academic advisor from the graduate field into which the student desires admission.

Completion of either 2(a) or 2(b) above does not guarantee graduate admission. Reclassification decisions employ the same procedures and requirements as those for admission. Postbaccalaureate, nondegree-seeking graduate, and graduate certificate students who

seek reclassification must be acceptable to the program in which they plan to major. The university does not have the capacity to accommodate all who meet the minimum requirements for regular graduate student status; when selecting among students who meet minimum requirements, the university treats students requesting reclassification the same as those applying for admission as regular graduate students.

A postbaccalaureate or nondegree-seeking graduate student may use graduate credit earned in this status toward an advanced degree or graduate certificate if the student is later reclassified as a regular graduate student. This credit cannot be used to satisfy residence requirements for an advanced degree. A graduate certificate student may use graduate credit earned in this status toward an advanced degree if the student is later reclassified as a regular graduate student. In either case, the amount of usable credit will depend on the size of the individual student's program (e.g., a maximum of 15 graduate credits could be used on a 45-credit master's program or a maximum of 6 graduate credits may be applied toward an 18-credit graduate certificate.) See section entitled "Transfer Credit" for complete details.

Students should initiate all requests for reclassification at the Graduate School.

SECOND OSU MASTER'S DEGREE

A candidate for a second master's degree from Oregon State University may request the application of up to 15 credits, appropriate to both programs, from the first master's degree program to another, subject to the following three requirements:

1. Credits used to satisfy the residency requirements of one master's degree may not be used to satisfy the residency requirements of another master's degree.
2. Students who earn two master's degrees at Oregon State University must complete all degree requirements for each degree. This requires filing separate programs of study forms for each degree, filing separate commencement applications for each degree, completing separate projects or theses for each degree, scheduling separate final oral examinations for each degree, and passing final oral examinations for each degree.
3. Such credit will be granted only for graded course work earned at Oregon State University and completed with a grade of B or higher.

PURSUIT OF THE SECOND PhD

The doctor of philosophy degree is the highest academic degree granted by North American universities. It is a research degree designed to prepare a student to become a scholar; that is, to discover, integrate, and apply knowledge, as well as communicate and disseminate it. The doctor of philosophy degree is to be distinguished from other doctorates such as the MD, JD, or EdD degrees, which are designed for professional training or which focus on applied rather than basic research. As is the common practice of most North American universities, Oregon State University seldom approves requests for pursuit of the second PhD.

The Graduate Dean will determine whether or not a student may be admitted for the second PhD. The dean may seek the advice of the Graduate Council in the deliberation of these cases.

RE-ENROLLMENT

All credential-seeking graduate students will be subject to the continuous enrollment policy. Continuous graduate enrollment refers to the policy of requiring continuous registration of graduate students from original matriculation until all graduate degree or certificate requirements are met. Please refer to Registration Requirements under Policies Governing All Graduate Programs for complete details.

A graduate student who takes an unauthorized break in registration by failing to maintain continuous enrollment or by failing to obtain regular or planned leave of absence will relinquish his/her graduate standing in the university. Students who wish to have their graduate standing reinstated will be required to file an Application for Graduate Readmission, pay the readmission fee, and register for 3 graduate credits for each term of unauthorized break in registration.

International students who wish to re-enroll after an absence should check in with International Student Advising and Services to make sure they have the required documents to return to the US.

GRADUATE TUITION AND FEES

The official Graduate Tuition and Fee Schedule for 2013–2014 can be found on the OSU Business Affairs site: <http://oregonstate.edu/fa/businessaffairs/student>.

Tuition and fees for the next year are usually finalized during the month of July prior to the academic year start.

For information about residency status, visit: <http://oregonstate.edu/admissions/main/residency-2>.

POLICIES GOVERNING ALL GRADUATE PROGRAMS

GRADUATE MAJOR

A graduate major is the area of academic specialization, approved by the State Board of Higher Education, in which the student chooses to qualify for a graduate degree. Upon completion of a graduate degree, the degree awarded and the graduate major are listed on the student's transcript.

GRADUATE OPTION

Options are for students of a specific major. An option is one of several distinct variants of course aggregations within a major that focus on an area of study designed to provide a student with specialized knowledge, competence, and skills while sharing a minimum core of courses.

A graduate option consists of a minimum of 12 designated quarter credits of related course work (excluding thesis credits), comprised of course work offered by the sponsoring unit as well as by other academic units. The option may be comprised of specific courses, completion of a designated number of credits from a longer list of alternative courses, or a combination of specific and alternative course lists. Approved options may be added to a graduate program of study, and approved by the faculty advisor(s) and the director of the sponsoring unit. On the program of study, there should be no overlap in course credits between options (the same course cannot be used to satisfy credit requirements in multiple options). When the unit submits the final examination card to validate awarding of the major to the Graduate School, the unit will also validate that the requirements of the option have been completed.

GRADUATE AREA OF CONCENTRATION

A graduate area of concentration is a subdivision of a major or minor in which a strong graduate program is available. Areas of concentration may be referenced on the student's program of study, but they are not listed on the student's transcript.

GRADUATE MINOR

A graduate minor is an academic area that clearly supports the major. Master's program minors must include a minimum of 15 quarter credits of graduate course work; doctoral minors require a minimum of 18 credits. On a master's or doctoral program, a minor may be:

1. an academic area available only as a minor,
2. a different major,
3. the same major with a different area of concentration,

4. an approved major at another institution in the Oregon University System, or
5. an integrated minor.

An integrated minor consists of a series of cognate courses from two or more areas. These courses must be outside the major area of concentration, with most of the courses being outside the major department. The graduate faculty member representing the integrated minor must be from outside the major department. Graduate minors are listed on the student's transcript.

CONCURRENT MASTER'S DEGREES

Students who earn two master's degrees at Oregon State University must complete all degree requirements for each degree. This requires filing separate programs of study forms for each degree, filing separate commencement applications for each degree, completing separate projects or theses for each degree, scheduling separate final oral examinations for each degree, and passing final oral examinations for each degree. For additional information, please refer to the Transfer Credit section of this catalog.

DUAL MAJORS

For the MA, MS, EdM, MF, or PhD degree, a student may select two graduate major areas to pursue instead of the traditional single major. Only one degree is awarded, and the student basically must satisfy all degree requirements for majors in both areas. For more details, contact the Graduate School.

GRADUATE CERTIFICATE

A graduate certificate program is a structured progression of graduate-level courses that constitute a coherent body of study with a specific defined focus within a single discipline or a logical combination of disciplines. It is designed for a student who has completed a baccalaureate degree and is in pursuit of advanced-level learning. Graduate certificates reflect the educational mission of the university.

TRANSFER CREDIT

Students who wish to transfer graduate credits from other schools must provide transcripts for courses already completed to the Graduate School prior to the submission of a study program. Undergraduate students at OSU may receive credit for graduate courses (500 and 600 level) in excess of the requirements for a baccalaureate degree. Graduate courses taken at OSU while the student was a non-degree graduate student, a post-baccalaureate student, a professional degree-seeking student (PharmD or DVM), or an undergraduate student, are considered transfer courses.

Courses to be transferred **must be graduate level** with letter grades of B (3.00) or better. Courses delivered off-campus or by electronic means must satisfy the OSU guidelines for the electronic delivery of courses. It is the responsibility of the student wishing to transfer the course to provide the necessary documentation to satisfy the OSU guidelines. Traditional extension and correspondence courses with no live or real-time interaction with the instructor are not transferable.

Graduate courses may be transferred if:

1. the work is appropriate to and will be placed on the student's graduate certificate or degree program;
2. the transfer is approved by the student's committee (for degree-seeking students), by the major program or department, and by the Graduate School; and
3. grades of B (3.00) or better have been earned.

If the transfer credit is from a foreign university, the student must provide copies of the original transcript and an English translation of the transcript, with the courses to be transferred clearly indicated. Grades and credits for the courses must be clearly identified. In some countries, the first university degree, which OSU considers to be equivalent to a baccalaureate degree, may take five years or more to complete. All of the course work toward such a degree is considered a requirement for the first university degree, and hence none of it can be transferred to a graduate certificate or graduate degree at OSU.

Students may not transfer courses graded on a nonstandard basis (e.g., Pass/No Pass, Credit/No Credit, Satisfactory/Unsatisfactory) to their graduate certificate or degree programs unless it can be verified from the registrar of the university offering the course that the grade is equivalent to a B (3.00) or better.

Graduate courses to be transferred from another institution to an OSU master's degree must not have been used to satisfy the requirements for a bachelor's degree, master's degree (or equivalent) or a doctoral degree.

Graduate courses to be transferred from an OSU master's degree to a second OSU master's degree must meet the following three requirements:

1. Credits used to satisfy the residency requirements of one master's degree may not be used to satisfy the residency requirements of another master's degree.
2. Students who earn two master's degrees at Oregon State University must complete all degree requirements for each degree. This requires filing separate programs of study forms for each degree, filing

separate commencement applications for each degree, completing separate projects or theses for each degree, scheduling separate final oral examinations for each degree, and passing final oral examinations for each degree.

3. Such credit will be granted only for graded course work earned at Oregon State University and completed with a grade of B or higher.

Up to 15 graduate credits may be transferred toward a 45-credit master's degree. Up to 6 graduate credits may be transferred toward an 18-credit graduate certificate.

Graduate courses to be transferred to a doctoral degree program can be courses that were used to satisfy the graduate course requirements for a graduate certificate or a master's degree (or equivalent). Selected 700-level courses that have been deemed equivalent to graduate-level learning may be used on doctoral programs of study upon approval of the student's graduate committee. There is no limit on transfer credit toward the doctoral degree as long as the doctoral residence requirement is satisfied.

Credits earned in fulfillment of a graduate certificate program may be applied to a graduate degree, so long as they meet the appropriate standards for use in the degree and the criteria to transfer credit as defined herein. Courses completed for a degree program may likewise be applied toward a certificate program.

PREPARATION REQUIRED FOR GRADUATE MAJOR

Preparation for a graduate major is ordinarily an undergraduate major in the same subject, or a fair equivalent. Preparation for a graduate minor is ordinarily at least one year of upper-division work in addition to foundation courses in the subject.

Academic performance is not the sole criterion for admission to and continuation in certain courses and programs at the university, such as practicum courses and internships. The university may find it necessary to evaluate a person's background to determine his or her likelihood of maintaining standards of professional conduct necessary in the academic discipline or profession. An evaluation may consider current performance as well as past experiences and actions that could affect a student's ability to perform in the particular course or program.

Qualifying Examinations. Some departments and programs require graduate students working for advanced degrees to take oral and/or written examinations in their major and minor fields to determine overall preparation and background. The examination serves as a guidance examination, the results of

which are used in setting up the graduate study program. A poor showing in any area may result in a student's taking undergraduate courses without graduate credit to gain the necessary background to proceed with the graduate program. The examination usually is taken during the first quarter of graduate enrollment.

In lieu of their own qualifying examination, departments and programs may accept a satisfactory showing in the Graduate Record Examination (GRE), or some other standard test. Check with the anticipated major department or program to find out which exams are appropriate.

REGISTRATION REQUIREMENTS

Introduction

Full-time status as a graduate student is defined by the Oregon University System as enrollment in 9 credits per term. The maximum load for a full-time graduate student is 16 credits. A student may exceed this limit only with the approval of the Graduate School. Students receiving approval to exceed 16 credits will be assessed a per-credit overload fee.

Full-time status (i.e., a minimum of 9 credits per term) may be sufficient to qualify for purposes of veterans' benefits, visa requirements, external fellowships, and federal financial aid.

To assure full compliance with visa regulations, international students should consult with the Office of International Student Advising and Services (ISAS) for additional information about registration requirements.

Continuous Enrollment

I. Minimum Registration

Unless on approved leave of absence (see Section II), all graduate students in graduate degree and certificate programs must register continuously for a minimum of 3 graduate credits until their degree or certificate is granted or until their status as a credential-seeking graduate student is terminated. This includes students who are taking only preliminary comprehensive or final examinations or presenting terminal projects. Students must register for a minimum of 3 credits and pay fees if they will be using university resources (e.g. facilities, equipment, computing and library services, or faculty or staff time) during any given term, regardless of the student's location. If degree requirements are completed between terms, the student must have been registered during the preceding term.

Graduate students who have successfully completed all course and non-course requirements in accordance with diploma deadlines (see the Graduate School website) are not required to register during the subsequent term.

Nonthesis master's degree students who complete all degree requirements

during a term for which they are registered will not be required to register for the subsequent term.

Doctoral and thesis master's students who fail to meet all deadlines and complete all course and noncourse requirements during the term will be required to register for a minimum of 3 graduate credits during the subsequent term. However, only if library copies of the thesis have been submitted to the Graduate School within the first two weeks of the subsequent term and the thesis is the only outstanding requirement remaining for certification of the student's graduate degree may an exception to this rule be considered.

Graduate students who do not plan to make use of university facilities or faculty time during summer session are not required to register during the summer session and do not need to submit a Leave of Absence/Intent to Resume Graduate Study form. In such instances, summer session will not be counted within allowed leave of absence limits (see section II.c.). However, if students do plan to utilize facilities or faculty time during summer session, they must register for a minimum of 3 graduate credits.

It should be noted that graduate assistantship eligibility requires enrollment levels that supersede those contained in this continuous enrollment policy. Various agencies and offices maintain their own registration requirements that also may exceed those specified by this continuous enrollment policy (e.g., those of the Veterans Administration, Immigration and Naturalization Service for international students, and those required for federal financial aid programs.) Therefore, it is the student's responsibility to register for the appropriate number of credits that may be required for funding eligibility and/or compliance as outlined by specific agency regulations under which they are governed.

II. Leave of Absence

On-leave status is available to students who need to suspend their program of study for good cause. Students who desire a leave of absence will work with their major professor, program administrator, and the Graduate School to arrange authorized leave. Graduate programs that are designed such that the offering of courses and/or the conduct of research/scholarly work are not on a continuous term-to-term basis will work with the Graduate School to arrange planned leave. Students understand that while on leave they will not use university resources. Graduate faculty members are students' most important resource at the university and will work closely with graduate students to ensure timely completion of academic goals, understanding of the continuous gradu-

ate enrollment policy, and that graduate students enroll each term other than when they are on authorized leave. The Graduate School will assist graduate students and graduate faculty members with administrative procedures related to the continuous graduate enrollment policy. The Graduate School recognizes the diverse circumstances and unpredictability of graduate students' lives and will work in partnership with the graduate community in arranging leaves and responding to unanticipated situations.

A graduate student intending to resume active graduate student status following interruption of his or her study program for one or more terms, excluding summer session, must apply for regular or planned leave of absence to maintain graduate student standing in his or her degree program and to avoid registration for 3 graduate credits for each term of unauthorized break in registration (See Section IV below). Leave of Absence/Intent to Resume Graduate Study Forms must be received by the Graduate School at least 15 working days prior to the first day of the term involved. The time the student spends in approved on-leave status will be included in any time limits relevant to the degree (See Sections C.1. and C.2. below). Students in on-leave status may not a) use any university facilities, b) make demands upon faculty time, c) receive a fellowship or financial aid, or d) take course work of any kind at Oregon State University.

a. **Eligibility.** Only graduate students in good standing are eligible for leave of absence.

b. **Leave of Absence Categories**

1. **Regular.** Regular leave of absence is granted on a term-by-term basis in cases where the student demonstrates good cause (e.g. illness, temporary departure from the university for employment, family issues, financial need, personal circumstances). The student must indicate reason for on-leave status.

2. **Planned.** Planned leave of absence is granted to students for whom the design of their academic program is such that the offering of courses and/or the conduct of research/scholarly work are not on a continuous term-to-term basis. Planned leave of absence is set by the program with the approval of the Graduate School. (For a current list of planned leaves, consult the Graduate School at 541-737-4881.) Planned leave of absence includes students enrolled in summer-only programs and graduate students in other programs that have been pre-approved by the Graduate School for planned leave of absence.

Summer-only students and other students who qualify for planned leave of absence must:

- a. be in good standing,
- b. submit the Leave of Absence/Intent to Resume Graduate Status form indicating each term for which leave is requested, and
- c. complete all degree requirements within the time limits established in this catalog. Requests for multiple terms of leave may be submitted at one time.

3. **Family and Medical Leave.**

This leave is different from regular leave in that it is for 12 continuous weeks that may span multiple terms and must meet FMLA leave requirements as determined by the Office of Human Resources. See policy a http://oregonstate.edu/dept/grad_school/docs/Graduate-Student-Family-and-Medical-Leave-Policy.pdf.

d. **Limits**

1. **Regular Leave of Absence** is granted for a specified time period that may not exceed three terms, excluding summer session. In no case may regular on-leave status exceed the maximum listed below throughout the student's entire degree program.

a. **Master's Degree.** Master's degree students, except for summer-only students, may request a maximum of three academic terms of regular on-leave status during the course of study for the degree. The time spent in approved on-leave status will be included in the seven-year time limit for completing all requirements to the master's degree.

b. **Doctoral Degree.** Doctoral degree students may apply for a maximum of three academic terms of regular on-leave status prior to advancement to candidacy, and they may apply for a maximum of three academic terms of on-leave status after advancement to candidacy. The time spent in approved on-leave status will be included in the maximum five years that may elapse between the preliminary oral examination and the final oral examination.

2. **Planned Leave of Absence** is available for a maximum of nine terms, excluding summer session, to students enrolled in programs for which planned leave has been

approved by the Graduate School. However, time spent in planned on-leave status will be included in all time limits pertaining to the student's degree program.

3. **Family and Medical Leave** is available for 12 continuous weeks that may span multiple terms and must meet FMLA leave requirements as determined by the Office of Human Resources. These absences will be included in all time limits pertaining to the student's degree program. Contact the Graduate School for additional details.

d. **Approval.** Approval of the major professor, department/program chair, and graduate dean are required.

III. **Student Fees**

Students with approved on-leave status are not required to pay tuition or fees. However, students who must register as per section I, "Minimum Registration," must pay both tuition and student fees.

IV. **Unauthorized Break in Registration**

A graduate student who takes an unauthorized break in registration by failing to maintain continuous enrollment or by failing to obtain regular or planned leave of absence will relinquish his or her graduate standing in the university. Students who wish to have their graduate standing reinstated will be required to file an Application for Graduate Readmission, pay the readmission fee, and register for 3 graduate credits for each term of unauthorized break in registration. The readmission application must be approved by the student's major professor, department/school/program chair, and graduate dean. Acceptance back into a graduate program is not guaranteed even if the student departed in good standing. The petitioner for readmission will be required to meet university and departmental admission requirements and degree completion requirements that are in effect on the date of readmission. Review of the Application for Graduate Readmission may also result in a change of residency status from resident to nonresident.

When readmission is approved, the student must register for a minimum of 3 graduate credits for each term of unauthorized break in registration in addition to the minimum 3 credit registration required during the first term of reinstatement and each subsequent term until all degree requirements have been met except for any subsequent term of approved leave as provided in Section II of this policy. If the accumulated credits total more than 16, the student may be required to enroll in more than one term of increased registration.

V. Appeal

In the case of extraordinarily extenuating circumstances, students may appeal the provisions of the continuous graduate enrollment policy by submitting a detailed request in writing to the dean of the Graduate School for additional terms of leave of absence or forgiveness of additional credits of registration.

IMPLEMENTATION OF CONTINUOUS ENROLLMENT POLICY

All graduate students, including those enrolled prior to fall 2002, are subject to this policy, regardless of their original matriculation date.

All graduate students should be enrolled for a reasonable number of credits sufficient to represent their use of university space, facilities or faculty time.

REGISTRATION REQUIREMENTS FOR GRADUATE ASSISTANTS

In addition to the above registration requirements, the following requirements apply to graduate teaching assistants (GTA) and graduate research assistants (GRA).

As a condition of their academic appointments, graduate teaching and research assistants are required to register for 3 credits above the minimum full-time load (i.e., a minimum of 12 credits) each term of the appointment during the academic year (fall, winter, and spring.) During summer session, a minimum registration of 9 credits is required for graduate assistants. Audit registrations, course withdrawals, and enrollment in INTO OSU courses may not be used to satisfy enrollment requirements for graduate assistant salary/stipend, tuition remission, salary supplement or health insurance benefits. Tuition charges associated with INTO OSU enrollment are not covered under graduate assistant tuition remission.

GRADE REQUIREMENT

A grade-point average of 3.00 (a B average) is required: 1) for all courses taken as a degree-seeking graduate student, and 2) for courses included in the graduate degree or graduate certificate program of study. Grades below C (2.00) can not be used on a graduate program of study. A grade-point average of 3.00 is required before the final oral or written exam may be undertaken.

COURSE NUMBERS

Graduate Courses

All graduate courses will be designed around well-defined objectives or student learning outcomes, and instructional opportunities should be designed to help students achieve these outcomes. Student learning outcomes encompass the range of student attributes and abilities that

students should be able to demonstrate after successful completion of the course.

500-Level Courses

These courses are graduate courses offered primarily in support of graduate certificate or master's degree programs but which are also available for use on doctoral level degree programs.

Undergraduates of superior scholastic achievement may be admitted to these courses on the approval of the instructor, and they may, if admitted, under some conditions, use a limited number of these courses toward a graduate certificate or a graduate degree program. These courses have one or more of the following characteristics:

1. They require upper-division prerequisites in the discipline.
2. They require an extensive theoretical base in the discipline.
3. They increase or re-examine the existing knowledge or database of the discipline.
4. They present core components or important peripheral components of the discipline at an advanced level.

600-Level Courses

These are graduate courses offered principally in support of doctoral level instructional programs but also are available for use on graduate certificate or master's level degree programs. In addition to exhibiting the characteristics of 500-level courses, these courses typically require 500-level prerequisites and they build on and increase the information presented in 500-level courses.

OTHER COURSES:

700-Level Courses

These are advanced professional or technical courses that may be applied toward a first professional degree (e.g. DVM, PharmD). They make up the bulk of the course work for these professional degree programs. In general, these courses are not considered graduate-level courses, and may not be applied toward graduate certificate, master's level or doctoral level (PhD or EdD) degree programs. However, selected 700-level courses that have been deemed equivalent to graduate-level learning may be used on doctoral programs of study upon approval of the student's graduate committee.

800-Level Courses

These courses are in-service courses aimed at practicing professionals in the discipline. These courses have an in-service or retraining focus, and provide the professionals new ways to examine existing situations or new tools to treat existing problems. These courses generally have none of the characteristics of 500-level courses. They are not graduate-level courses, and they may not be applied to graduate certificate or graduate

degree programs nor to professional degree programs.

BLANKET-NUMBERED COURSES

Blanket-numbered courses have a zero middle digit. Those that carry graduate credit may be repeated up to the maximum totals indicated below.

- **Research** (501 or 601) is for research that is not part of the thesis. Data obtained from such research should not be incorporated into the thesis.
- **Thesis** (503 or 603) covers the thesis research and writing. A student may register for thesis credit each term.
- **Reading and Conference** (505 or 605) and **Projects** (506 or 606) are used for special work not given under a formal course number.
- **Seminar** (507 or 607) is used both for departmental seminars and for special group work not given in a formal course.
- **Workshop** (508 or 608) is usually a special, short-term course covering a variety of topics.
- **Practicum** (509) is used for courses whose emphasis is the application of academic theory to the work environment.

No more than 9 credits of blanket-numbered courses, other than thesis (or research-in-lieu-of-thesis for nonthesis programs), may be applied toward the minimum 45-credit master's degree. While internship credit (510) is not considered a blanket-numbered course, no more than 6 credits of internship may be applied toward a 45-credit master's degree. The internship credit limit is in addition to the 9-credit blanket-hour limit.

No more than 15 blanket-numbered credits may be applied toward the minimum 108-credit doctoral program.

No more than 3 credits of blanket-numbered courses in each field of study may be used in the MAIS program; thesis credits or research paper credits are exempt from this limitation.

Blanket-numbered transfer courses will count toward the maximum totals specified above.

COURSES GRADED ON NONSTANDARD BASIS

Graduate students may elect to take courses on an S/U basis only if those courses are not in their graduate certificate or graduate degree program or are not required for the removal of deficiencies. Graduate students may use courses taken at OSU on a P/N basis in their graduate certificate or graduate degree programs.

4XX/5XX COURSES

No more than 50% of courses USED for a graduate program of study may be the

500-level component of a dual-listed course. Courses bearing dual-listed numbers (400/500) must provide students who are enrolled for 500-level credit with graduate-level learning.

Expectations for learning outcomes in the graduate component of dual listed (400/500 level) courses are the same as for stand-alone 500-level courses. A distinction should be made between learning outcomes for students taking the course for undergraduate credit (400 level) and those taking the course for graduate credit (500 level). In most cases this distinction should include emphasis on developing skills in analysis, synthesis, and/or evaluation for the 500-level credit. The different student learning outcomes should be accompanied by appropriate differences in instructional opportunities and evaluation procedures.

REPEATING 4XX/5XX COURSES

A graduate student who has taken a 4xx course may not normally include the corresponding 5xx course on his or her graduate program.

REMOTE ACCESS FOR GRADUATE COMMITTEE MEETINGS

It is generally expected that all members of graduate committees should be physically present at all required graduate committee meetings (i.e., program meetings, preliminary examinations, and final examinations). However, it is permissible for the student, and/or committee members to participate from a remote location provided the conditions listed below are met:

- Advance agreement of the student and all committee members has been obtained;
- All participants join in with two-way audio and video connections; audio-only connections must be approved by the major professor if the video connection is not possible. When the student is the remote participant, his or her connection must be an audio and video connection;
- Any visual aids or other materials have been distributed in advance to the remote participants;
- The committee members participate in the complete meeting, discussion, presentation, and evaluation; and
- The student is responsible for making arrangements.

PETITIONS

A student wishing to deviate from normal Graduate School regulations and procedures may submit a request and the reasons for it to the Graduate School in a letter signed by the student and his or her major professor. In reaching a

decision, the Graduate School may seek advice from the Graduate Council. The student will be advised of the decision when it has been made. Action taken on a petition will not be considered precedent for future action.

DIPLOMA APPLICATION

Graduate students wishing a printed diploma must complete a Diploma Application form. This form should be submitted prior to taking the final examination, indicating the term the student intends to graduate.

INSTITUTIONAL REVIEW BOARD APPROVAL OF HUMAN SUBJECTS RESEARCH

It is Oregon State University policy that the OSU Institutional Review Board (IRB) must review all research that involves human subjects. The results from studies conducted without obtaining IRB review and approval may not be published or widely distributed, nor can such data be used to satisfy honors thesis, master's thesis or doctoral dissertation requirements.

The requirements for IRB review of research involving human subjects is based upon research ethics and federal law, and the implications of conducting human subjects research without IRB approval are significant. Failure to follow this policy places both the individual and the institution at risk: the individual may be subject to university sanctions and/or incur personal liability for negligence and harm; the university could lose access to federal funding or be forced to cease all human subjects research. For more information, please send an email to irb@oregonstate.edu or visit the IRB website at <http://oregonstate.edu/research/irb/>.

GRADUATE WORK BY FACULTY MEMBERS

Oregon Administrative Rule (OAR) 580-020-0005 specifies that one may not simultaneously be an Oregon University System (OUS) faculty member and an OUS graduate student. This policy pertains to all OSU faculty members (both ranked and professional), is consistent with practices at most universities, and is in keeping with recognized appropriate graduate education practice.

Although faculty members are eligible to enroll for courses at staff fee rates, such course work may not be applied to a graduate certificate or graduate degree without prior approval from the graduate dean.

GRADUATE STUDENT TEACHING

Students working toward graduate certificates or advanced degrees are not permitted to teach graduate courses.

GRADUATE APPOINTMENTS

Some graduate assistants may be represented by the Coalition of Graduate Employees, American Federation of Teachers Local 6069 (CGE). For these graduate assistants, terms and conditions of employment for service not performed as a requirement for their degrees are prescribed in the collective bargaining agreement between OSU, OUS, and CGE. The CGE contract can be found on the OHR website at <http://oregonstate.edu/hr/ercc/gradstud>.

Persons interested in assistantships should write directly to the department program concerned.

To qualify for appointment as a graduate assistant the student must:

- Be a regularly admitted, conditionally admitted, or provisionally admitted graduate student at Oregon State University (i.e., not a graduate nondegree-seeking, postbaccalaureate student, or PharmD or DVM student).
- Be enrolled as a full-time degree-seeking graduate student at Oregon State University, completing a minimum of 12 credits of instruction each term (9 credits during summer session). Audit registrations, course withdrawals, and enrollment in INTO OSU may not be used to satisfy these minimum enrollment requirements.
- Be making satisfactory progress toward an advanced degree.

Graduate assistants may be appointed on an academic term basis, an academic-year basis (nine months) or a full-year basis (12 months). No appointment can be for less than .20 FTE or more than .49 FTE per term. A graduate assistant on less than .49 FTE may take on extra duties; however, **the total stipend plus salary from all sources within the Oregon University System may not exceed the equivalent of .49 FTE for any term.**

All graduate assistants are required to provide duties to OSU to justify their stipends. Teaching assistants are expected to provide duties related to the university's instructional program (e.g., teaching laboratories or discussion sections, grading papers, advising). Research assistants provide duties related to the research function of the university. Whatever the type of appointment, the graduate assistant should be regarded as a student providing service as part of a learning experience rather than as an employee whose education is secondary.

The work schedule and the duties to be performed by the graduate assistant shall be established by the department or program sponsoring the assistantship.

Graduate assistants must register for and complete a minimum of 12 credits of instruction each term except during

summer session, when a minimum of 9 credits is required. Audit registrations, course withdrawals, and enrollment in INTO OSU courses may not be used to satisfy these minimum enrollment requirements. (See section on 'Registration Requirements for Graduate Assistants' for complete details.)

Persons interested in assistantships should write directly to the department or program concerned.

INTERNATIONAL GRADUATE TEACHING ASSISTANT ENGLISH LANGUAGE REQUIREMENT

If the Graduate School determines that an applicant or current student's native language is not English, the proposed IGTA is required to take the Internet Based TOEFL (iBT) test before being appointed as a graduate teaching assistant. (Students who matriculated prior to Winter 2010 are exempt from this policy.)

Potential IGTA's scoring below 22 on the speaking section of the iBT can be appointed, but will be required to undertake further English language training.

If a department wishes to offer a student with an iBT speaking score of 18 to 21 an assistantship, the unit must:

- a. Affirm that the graduate student will be enrolled in IEPA 098NC Communication for IGTA's (with the unit paying the cost of this training).
- b. If at all possible, assign the graduate student assignments (such as paper grading, reagent preparation, etc.) that do not require personal contact with undergraduate students.
- c. If (b) above is not possible, and if possible, pair the IGTA in the laboratory or classroom with another TA who is a native speaker of English.
- d. Monitor the quality of IGTA performance using student evaluations and the evaluations of the supervising professors. The unit will document for each student the results of their evaluation of the student's performance as a GTA.

If the unit agrees to meet these conditions, the IGTA appointment can be made.

The scheduling of IEPA 098NC will be coordinated with the units so that students can attend the course and conduct teaching assistantship duties. Please check the OSU online schedule of classes for confirmation of the time and date:

<http://catalog.oregonstate.edu/CourseDetail.aspx?subjectcode=IEPA&coursenumber=098NC>

Students with an iBT speaking score of less than 18 cannot be assigned teaching assistantships.

DISMISSAL FROM GRADUATE SCHOOL

Advanced-degree students (regularly, conditionally, and provisionally admitted) are expected to make satisfactory progress toward a specific academic degree. This includes maintaining a GPA of 3.00 or better for all courses taken as a graduate student and for courses included in the graduate program, meeting departmental or program requirements, and participating in a creative activity such as a thesis.

If a student is failing to make satisfactory progress toward an academic degree, as determined by the major department/program or the Graduate School, the student may be dismissed from the Graduate School.

Any doctoral student who fails the preliminary oral examination with a committee recommendation that the student's work toward this degree be terminated may be dismissed from the Graduate School.

Any student who fails a final oral examination may be dismissed from the Graduate School.

Academic dishonesty and other violations of the Student Conduct Code may serve as grounds for dismissal from the Graduate School.

STUDENT CONDUCT REGULATIONS

Graduate students enrolled at Oregon State University are expected to conform to basic regulations and policies developed to govern the behavior of students as members of the university community. The regulations have been formulated by the Student Conduct Committee, the Student Activities Committee, the university administration, and the State Board of Higher Education. Violations of the regulations subject a student to appropriate disciplinary or judicial action. The regulations and the procedures for disciplinary action and appeal are available via the Office of Student Conduct and Community Standards website at <http://oregonstate.edu/studentconduct/>.

GRIEVANCE PROCEDURE

All students desiring to appeal matters relating to their graduate education should request a copy of Grievance Procedures for Graduate Students at Oregon State University from the Graduate School. These procedures are also available on the Web at http://oregonstate.edu/dept/grad_school/grievance.php. Graduate assistants whose terms and conditions of employment are prescribed by the collective bargaining agreement between OSU, OUS, and the Coalition of Graduate Employees, American Federation of Teachers Local 6069 should also refer to that document.

POLICIES GOVERNING GRADUATE CERTIFICATE PROGRAM

GENERAL REQUIREMENTS

The Graduate Certificate Program at Oregon State University is a structured progression of graduate-level courses that constitute a coherent body of study with a defined focus within a single discipline or a logical combination of disciplines. It is designed for a student who has completed a baccalaureate degree and is in pursuit of advanced-level learning. Graduate certificates reflect the educational mission of the university. Students desiring a graduate certificate must be admitted to the university as a credential-seeking graduate student, but are not required to be on track for a specific degree. There is no formal committee requirement for graduate certificates. Certificate students are subject to all general policies governing the courses for the master's degree.

GRADUATE CERTIFICATE STUDY PROGRAM

The graduate certificate curriculum consists of a minimum of 18 graduate credits, and may include a final project, portfolio, or report for integration of the sequence of course materials. All graduate student programs of study submitted to the Graduate School must consist of, at a minimum, 50 percent graduate stand-alone credits. The remaining credits may be the 500 component of 400/500 slash courses. No final examination is required.

TIME LIMITS

Courses completed no more than seven years prior to the graduate certificate award may be used to satisfy certificate requirements.

FINANCIAL AID ELIGIBILITY

Students enrolled in only graduate certificate programs may qualify for federal loan and work-study financial aid. Students must complete the federal FAFSA form to begin the financial aid application process.

POLICIES GOVERNING MASTER'S DEGREE PROGRAMS

GENERAL REQUIREMENTS

All master's degree programs require a minimum of 45 graduate credits including thesis (6 to 12 credits) or research-in-lieu-of-thesis (3 to 6 credits). Exceptions to this capstone requirement are specified under the degree descriptions that follow these universal master's degree requirements. Effective fall 2005, all graduate

student programs of study submitted to the Graduate School must consist of, at a minimum, 50 percent graduate stand-alone courses. The remaining credits may be the 500 component of 400/500 slash courses. General regulations for all master's programs are cited here, with certain exceptions provided for master's degrees in the professional areas listed on the following pages.

All master's students must:

- Conduct research or produce some other form of creative work, and
- Demonstrate mastery of subject material, and
- Be able to conduct scholarly or professional activities in an ethical manner

The assessment of these outcomes and the specification of learning objectives related to these outcomes are to be carried out at the program level.

RESIDENCE REQUIREMENTS

The residence requirement for the master's degree is 30 graduate Oregon State University credits after admission as a degree-seeking graduate student. These 30 graduate credits must appear on the master's degree program. (This does not include credits reserved as an undergraduate or postbaccalaureate student, credits taken as a postbaccalaureate or graduate nondegree-seeking student, nor transfer courses.) Deviation from the residence requirement requires a petition to the Graduate School.

LANGUAGE REQUIREMENTS

For the master of arts degree, the student must show foreign language proficiency (including American Sign Language) equivalent to that attained at the end of a second-year university course in that language with a grade of "C" (2.00) or better. English is not considered a foreign language for purposes of this requirement. There is no language requirement for the Master of Arts in Interdisciplinary Studies degree. For other master's degrees, there is no foreign language requirement unless a language is required in the individual student's program. The foreign language requirement for the MA degree must be completed before the student takes the final oral examination for the degree.

GRADUATE STUDY PROGRAM

A regular master's degree student must complete a plan of study in consultation with an advisor/advisory committee before completing 18 graduate credits. This includes credits reserved as an undergraduate or postbaccalaureate student and credits earned as a postbaccalaureate, graduate nondegree-seeking student, or graduate student.

Students who wish to transfer credit must submit a Transfer Credit Request form before the end of their first year of study.

The final plan of study must be submitted to the Graduate School at least 15 weeks prior to the date of the student's final examination.

Effective fall 2005, all graduate student programs of study submitted to the Graduate School must consist of, at a minimum, 50 percent graduate stand-alone courses. The remaining credits may be the 500 component of 400/500 slash courses.

If a minor is declared, approximately two-thirds of the work (30 graduate credits) should be listed in the major field and one-third (15 graduate credits) in the minor field. In such cases, the student's advisory committee must include a member from the minor department.

The program is developed under the guidance of the major professor, and minor professor when a minor is included, and signed by those professors and the chair of the academic unit before filing in the Graduate School. Each candidate's program should include substantial work with at least three faculty members offering graduate instruction. Changes in the program may be made by submitting a Petition for Change in Program form, available in the Graduate School.

TIME LIMIT

All work toward a master's degree, including transferred credits, course work, thesis (if required), and all examinations, must be completed within seven years.

THESIS

When scheduling their final oral examinations, thesis option master's students are required to submit the pretext pages of their thesis to the Graduate School at least two weeks prior to the final oral examination. Pretext pages include the abstract, copyright, title page, approval page, acknowledgment page, contribution of authors, table of contents, list of figures, tables, appendices, dedication (optional), and preface (optional). It is expected that students will distribute examination copies to all their committee members, including the Graduate Council representative, sufficiently early to permit thorough review of the thesis prior to the student's final oral examination.

Within six weeks after the final oral examination or before the first day of the following term, whichever comes first, upload one PDF copy of your thesis, without signatures, electronically to ScholarsArchive and submit the signed ETD submission approval form with a copy of the title page to the Graduate School. If final submission requirements are after the initial six-week period, the

student may be subject to re-examination. Please refer to the Graduate School's website for complete details (<http://gradschool.oregonstate.edu/success/thesis-guide>).

Signatures on the ETD submission approval form can be electronic, signed, scanned and emailed or faxed. The thesis will not be accepted for graduate requirements until it has received approval by the graduate dean, which the thesis editor will get.

Full information concerning the prescribed style for theses is given in the booklet, Thesis Guide: Preparing a Thesis or Dissertation at OSU, available on the Web at <http://gradschool.oregonstate.edu/success/thesis-guide>.

The results from studies conducted using human subjects without obtaining Institutional Review Board approval shall not be used to satisfy master's thesis or doctoral dissertation requirements. For more information, please send an email to irb@oregonstate.edu or visit the IRB website at <http://oregonstate.edu/research/irb/>.

The credit allowed for the thesis, including research and preparation of the manuscript, varies from 6 to 12 credits. In certain departments and programs, the MS or MA thesis is optional, to be determined in each case by the department/school/program and the major professor. See departmental descriptions.

FINAL EXAMINATION

Successful completion of a final oral examination is required for all master's degrees with the exception of students who complete the nonthesis option under the EdM degree. In those cases, nonthesis EdM students must take a final written examination. Some departments also require the student to pass a written exam prior to the oral exam.

The final oral examination for master's candidates may, at the discretion of the graduate program, consist of a public thesis defense followed by a closed session of the examining committee with the candidate. Under normal circumstances, the final oral examination should be scheduled for two hours.

For master's candidates whose programs require a thesis, not more than half of the examination period should be devoted to the presentation and defense of the thesis; the remaining time can be spent on questions relating to the student's knowledge of the major field, and minor field if a minor is included in the program of study. Graduate faculty serving on thesis-oriented master's degree programs may contribute to the direction of the student's thesis, will assess the student's thesis and his or her defense of it in the final oral examination, will vote to pass or fail the student, and may sign the thesis when it is in acceptable final form.

The examining committee consists of at least four members of the graduate faculty—two in the major field, one in the minor field if a minor is included, and a Graduate Council representative. When a minor is not included, the fourth member may be from the graduate faculty at large. All members of the student's graduate committee must approve the scheduling of the final examination.

Students writing a thesis must have a Graduate Council representative on their committee. It is the student's responsibility to obtain his or her own Graduate Council representative from a list provided by the Graduate School. This must be done prior to scheduling the final exam.

When no thesis is involved, not more than half of the examination period should be devoted to the presentation of the research project; the remaining time can be spent on questions relating to the student's knowledge of the major field, and minor field if one is included in the program. For nonthesis master's degree programs, the major professor is responsible for directing and assigning a final grade for the research or culminating project. Other members of the nonthesis committee will assess the student's defense of the project in the final oral examination, as well as the student's knowledge of his or her field, and vote to pass or fail the student. The examining committee consists of three members of the graduate faculty—two in the major field and one in the minor field if a minor is included. When a minor is not included, the third member may be from the graduate faculty at large.

MASTER OF AGRICULTURE

The Master of Agriculture (MAG) degree requires a student to attain advanced knowledge and achievement integrated across three fields of study. Two of the three fields must be chosen from the approved graduate majors or minors offered within the College of Agricultural Sciences or closely related areas. Any graduate major or minor may serve as the third field for this degree. With appropriate justification, each of these three fields may contain integrated components.

A minimum of 45 credits is required for the degree with a minimum of 24 credits outside of the major. The program of study will include a major field and two minor fields. The major field must be in the College of Agricultural Sciences and contain a minimum of 12 credits (excluding research or thesis credit). Students have the option of a research paper (3–6 credits) or thesis (6 credits). Each minor field must contain a minimum of 9 credits. No more than 9 blanket-numbered credits are to be contained in the program, excluding research paper or thesis.

The program is administered by the academic department of the major field and requires the department head's signature. The student's committee will consist of a representative from the major and each minor field. A Graduate Council representative will serve on thesis programs. The committee will meet prior to the end of the student's second quarter in the program to approve the student's program of study and proposal. The proposal will include the student's academic/professional background, intended occupational/educational destination, and rationale for the course combinations. A final oral examination is required and may include questions from both the course work and the research paper or thesis.

MASTER OF ARTS IN INTERDISCIPLINARY STUDIES

The Master of Arts in Interdisciplinary Studies (MAIS) degree is granted for attainment of broad, advanced knowledge and achievement integrated from three fields of study. Most graduate majors or minors may serve as a field for this degree. The current list of approved majors is at <http://catalog.oregonstate.edu/MajorDetail.aspx?id=333>. Two of the three fields may be from one department if the areas of concentration within these two fields are different. A minimum of 9 credits in each of the three fields of study is required. The degree requires a minimum of 49 credits, including 4 credits of course work on interdisciplinary research methods.

No more than 21 credits (excluding thesis or research paper credit) may be taken in any field unless the total program exceeds 49 credits. There is no foreign language requirement. No more than 3 credits of blanket-numbered courses in each field of study may be used in the program; thesis credits (Option A) or research paper credits (Option B) are exempt from this limitation. The student's committee consists of four members of the graduate faculty—one from each of the three fields—and a Graduate Council representative. A formal program meeting must be held prior to the completion of 18 graduate credits. A final oral examination is required.

Two options under the program:

Option A: Thesis option. The thesis must coordinate work in the three fields. The requirement is 6 to 9 credits of Thesis 503. The thesis advisor must be a member of the graduate faculty authorized to direct theses.

Option B: Research paper option. The research paper must integrate work from at least two of the three fields. The requirement is 4 to 7 credits, registered as Research 501, Reading and Conference 505, or Projects 506.

MASTER OF ARTS IN TEACHING (MAT)

The Master of Arts in Teaching is an intensive professional degree program intended to prepare teachers for careers in public school education. Students who successfully complete the MAT can be recommended for the Oregon basic teaching license upon the positive evaluations of the university and public school supervisors.

The professional program in teacher education is full-time and one calendar year in length. Students will enroll with their subject area cohort group and complete the program in one year. Teacher licensure is offered in the following areas:

- Advanced Mathematics Education
- Agricultural Education
- Biology Education
- Chemistry Education
- Elementary Education
- Family and Consumer Sciences Education
- Integrated Science Education
- Language Arts Education (English) — *Cascades Campus only*
- Music Education
- Physics Education
- Spanish Education

The professional teacher education program begins with a 15-credit professional education core that is foundational to and a prerequisite for the 48-credit Master of Arts in Teaching degree. The 48-credit MAT includes a professional education concentration (3 credits), professional course work in the teaching specialty (18 to 21 credits), a public school professional internship (15 to 18 credits), and a minimum of 9 graduate credits in the subject matter specialization (mathematics, physics, literature, etc.). Because the professional teacher education program is a two-part program, including the professional core and the MAT, future students may plan their programs as either five-year (with a nine-month MAT) or as fifth year programs (with 12 months of graduate study including both the professional core and the MAT).

The MAT degree requires successful completion of a final oral examination.

MASTER OF BUSINESS ADMINISTRATION

The MBA program represents a broad, yet responsive general management education with an entrepreneurial focus that crosses the functional disciplines of business. Its advanced management emphasis and entrepreneurial focus creates practical value-added content for all students, both business and nonbusiness undergraduates, enabling them to solve complex business problems and successfully compete in the business marketplace.

The MBA program is concentrated in length—three academic terms for full-

time students with a BA/BS in business or who have completed the foundation courses. Full-time students with no previous business or business-related course work can complete the program in as few as six terms. The MBA degree requires no thesis. A final oral examination is required.

MASTER OF BUSINESS ADMINISTRATION AND ACCOUNTANCY

The Master of Business Administration and Accountancy is a one-year master's program for students with an undergraduate degree in accounting. It allows accounting students to receive an undergraduate degree and a master's degree during their five years of university study required to become a CPA. As an integrated program, the MBAA is designed to allow students the opportunity to plan early enough in their accounting education program to enable them to receive both an undergraduate degree and a graduate degree. The MBAA is also designed to accommodate postbaccalaureate students wishing to prepare for accounting careers.

MASTER OF EDUCATION

The Master of Education (EdM) is a professional degree requiring a minimum of 45 credits in graduate courses (including a maximum of blanket-numbered courses); additional credits may be required in some areas of concentration. A minimum of 9 additional credits in graduate courses is required for the master's degree in College Student Services Administration (CSSA).

The EdM degree requires successful completion of a final written examination.

A candidate for the EdM degree qualifies for the degree under one of these options:

1. The student submits a thesis that meets all standards for a master's thesis on some applied or professional aspect of education. For the thesis the student receives 6 credits. He or she must complete a major of 24 credits (which may include the 6 thesis credits) and 21 elective credits determined under the direction of an advisor.
2. For adult education, the student completes 30 credits in the major and at least 15 credits in the minor. The minor may be completed either inside education or from approved minors outside education and serves students focusing on training and development and developmental education.
3. The student completes 45 credits with 24 credits in specific courses for the major. No minor is identified. The remaining 21 credits are elective

under the direction of an advisor. No thesis or field studies are required. This option is designed primarily for in-service teachers working on standard licensure.

4. The student majors in College Student Services Administration and completes at least 39 credits in the major and 15 credits in a minor for a minimum of 54 credits.

MASTER OF ENGINEERING

The Master of Engineering (MEng) degree is designed to provide students the opportunity to pursue advanced-level study in a field of engineering. The degree is concerned with application of specialized, graduate-level engineering and managerial knowledge to specific engineering disciplines. The degree is a course work-only degree, with the option of substituting research or internship credits for a few courses. No thesis or project is required.

The MEng program requires a minimum of 45 credits. The examining committee consists of a minimum of three members of the graduate faculty in the engineering specialization. A final oral examination is required.

MASTER OF FINE ARTS

The Master of Fine Arts is an appropriate terminal degree for those who wish to teach in creative, performing, and studio arts in higher education. The MFA in Creative Writing is a program that helps students define and advance their literary ambitions and develop their skills as artists and teachers. Students will be introduced to three broad areas of knowledge within the field of creative writing that they need in order to become successful writers, editors, or teachers. These areas involve writing, reading, and marketing skills within contemporary literary fiction, poetry, and nonfiction. The degree requires a minimum of 60 credits comprised of 24 credits in creative writing workshops, 24 credits in literature and/or composition and rhetoric and one course emphasizing literary roots, and 12 credits in thesis and/or writing and conference. All MFA candidates are required to complete a thesis, which is to be a sustained piece of imaginative writing of literary merit. A final oral examination is required.

MASTER OF FORESTRY

The professional Master of Forestry degree is intended for potential administrators and professional forestry specialists in public and private organizations where persons of broad ability are demanded and a broad technical education is needed. The degree requires a minimum of 45 credits. At least 21 credits are to be selected from a series of designated courses within the College

of Forestry. As many as 24 credits may be elected from other courses offered by the college or university according to guidelines set forth in the program descriptions prepared by each department. The electives must contribute to a unified program that will meet the objectives of the student. A thesis is not required, but a technical report on an approved topic, correlated with courses in the major field, must be submitted. A final oral examination is required.

MASTER OF HEALTH PHYSICS

The Master of Health Physics degree is designed to be a professional, advanced graduate degree that emphasizes fundamental learning and professional development for those wishing the master's credential, but not requiring a research focus for their planned profession. The degree directs students toward professional licensing as a certified health physicist in the field of radiation protection. The program will consist of a minimum of 45 graduate credits, with 30 graduate credits in the major, and 15 elective graduate credits. A final oral examination is required.

MASTER OF MEDICAL PHYSICS

The Master of Medical Physics (MMP) degree prepares the graduate for a professional career in applied medical physics, focused on practical hands-on experience. The MMP program is designed as a clinical specialization for individuals with an undergraduate degree in science or engineering, offering areas of concentration in therapeutic radiologic physics or medical health physics. The degree requires a minimum of 45 graduate credits, including 30 graduate credits within the major and 15 elective graduate credits. The program does not require a thesis, however, candidates are required to pass a final oral examination.

MASTER OF NATURAL RESOURCES

The Master of Natural Resources (MNR) degree is designed to engage university scientists and world-wide natural resource professionals in a process that integrates diverse perspectives to address natural resource challenges at the state, regional, national, and international levels. The program is intended for individuals with at least two years of experience in natural resource disciplines who seek an advanced degree in natural resource management. The MNR curriculum, consisting of 45 credits, is organized into three sections: core (18 credits), area of emphasis (18 credits), and capstone project (9 credits). It is taught as a distance, online curriculum, although it may be possible for some students to work toward the MNR degree while in residence at Oregon State University. The

MNR degree is offered as a non-thesis option only. A final oral examination is required.

MASTER OF PUBLIC HEALTH

The Master of Public Health (MPH) degree program combines broad training in public health with specific training in one of the specialty tracks offered by the three participating universities: Oregon Health and Science University, Oregon State University, and Portland State University.

The MPH program is designed for persons who already have a bachelor's degree and who wish to obtain further formal education in the field of public health. Persons with experience in the health field or who have training in a specialized area of health may increase their knowledge regarding population-based health to prepare them for expanded administrative and service careers. Persons who do not have prior experience in health fields may prepare themselves for a broad variety of careers depending upon their choice of specialty track.

The Master of Public Health degree is offered by Oregon State University with concentrations in biostatistics; environment, safety and health; epidemiology; health management and policy; health promotion; health promotion and health behavior; international health.

Students who are admitted to a track are able to take core courses at any one of the participating universities through joint campus registration and have them count as resident courses.

The MPH program consists of 16 credits of core courses, plus additional units of required and elective courses, an internship, and a thesis or nonthesis project depending upon the specific track. Programs are approximately 60 credits in length. All students will be required to take a final oral examination as determined by their specific track.

MASTER OF PUBLIC POLICY

The Master of Public Policy is a professional degree intended to prepare students for careers in the public, non-profit, and international sectors and offer training for in-service students desiring professional growth and advancement. The degree is designed to be a generalist program, with an emphasis on analytic skills and policy knowledge. The degree requires a minimum of 62 graduate credits, 44 of which are in the required core. The core curriculum provides an important foundation in statistics, research methods, computer applications, public policy analysis, public administration and ethics, and economics. The remaining 18 credits support the student's preferred area of concentration, consisting of environmental policy,

international policy, rural policy, science policy, or social policy. Students with little work experience in public service, the nonprofit sector, or the international context will be required to engage in a supervised internship that will allow them to work closely with experienced mentors who will help them integrate theory with practice and introduce them to a professional network. Students with relevant work experience will substitute course work for internship credits. A final oral examination is required.

PROFESSIONAL SCIENCE MASTER'S DEGREE (PSM)

The Professional Science Master's (PSM) allows students to pursue advanced training in science while simultaneously developing workplace skills highly valued by employers. PSM programs consist of two years of academic training in an emerging or interdisciplinary area in science, along with a professional component that includes internships and "cross-training" in workplace skills, such as business, communications, and regulatory affairs. All have been developed in concert with employers and are designed to dovetail into present and future professional career opportunities.

The Professional Science Master's Degree (PSM) is offered with five graduate majors:

1. Applied Biotechnology
2. Applied Physics
3. Applied Systematics in Botany
4. Environmental Sciences
5. Fisheries and Wildlife Administration

For further information, contact Barbara Taylor, PhD, Director, Molecular and Cellular Biology, 3021 Agricultural and Life Sciences Building, 541-737-3799, taylorb@science.oregonstate.edu and milimag@cgrb.oregonstate.edu and Kirstin Carroll, PhD, 3029 Cordley Hall, 541-737-5259, kirstin.carroll@oregonstate.edu, Oregon State University, Corvallis, OR 97331.

POLICIES GOVERNING DOCTORAL DEGREE PROGRAMS

GENERAL REQUIREMENTS

The doctor of philosophy degree is granted primarily for creative attainments. There is no rigid credit requirement; however, the equivalent of at least three years of full-time graduate work beyond the bachelor's degree (at least 108 graduate credits) is required. Effective fall 2005, all graduate student programs of study submitted to the Graduate School must consist of, at a minimum, 50 percent graduate stand-alone courses. The remaining credits may be the 500 component of 400/500 slash courses. After admission into the doctoral program, a

minimum of one full-time academic year (at least 36 graduate credits) should be devoted to the preparation of the thesis. The equivalent of one full-time academic year of regular non-blanket course work (at least 36 graduate credits) must be included on a doctoral program.

As a result of successfully completing the requirements toward the PhD, students shall: (a) produce and defend an original significant contribution to knowledge; (b) demonstrate mastery of subject material; and (c) be able to conduct scholarly activities in an ethical manner. Additional outcomes, the assessment of all outcomes and the specification of learning objectives related to these outcomes are to be carried out at the program level.

GRADUATE STUDY PROGRAM

The student's doctoral study program is formulated and approved subject to departmental policies at a formal meeting of his or her doctoral committee, which consists of a minimum of five members of the graduate faculty, including two from the major department and a representative of the Graduate Council. If a minor is declared, it must consist of at least 18 credits (15 credits for an integrated minor) and the committee must include a member from the minor department. All committee members must be on the graduate faculty with appropriate authorization to serve on the student's committee.

The student must be registered for a minimum of 3 credits for the term in which the program meeting is held. When the program is approved by the doctoral committee, the departmental chair, and the dean of the Graduate School, it becomes the obligation of the student to complete the requirements as formulated. Changes in the program may be made by submitting a Petition for Change of Program form available in the Graduate School.

Selected 700-level courses that have been deemed equivalent to graduate-level learning may be used on doctoral programs of study upon approval of the student's graduate committee.

No more than 15 credits of blanket-numbered courses, other than thesis, may be included in the minimum 108-credit program.

A regular graduate student who holds a master's degree must complete a plan of study in consultation with their advisory committee by the end of one calendar year of enrollment as a doctoral student.

A regular graduate student who does not hold a master's degree must complete a plan of study in consultation with their advisory committee by the end of the fifth quarter of enrollment as a doctoral student.

Students who wish to transfer credit must submit a Transfer Credit Request form before the end of their first year of study.

The final plan of study must be submitted to the Graduate School six weeks before the student's oral preliminary examination.

RESIDENCE

For the doctoral degree, the residence requirement consists of two parts:

1. a minimum of 36 graduate Oregon State University credits must be completed; and
2. the student must spend at least three terms of full-time graduate academic work (at least 9 credits per term) on campus or at an off-campus site approved by the Graduate School. The latter requirement of three terms of full-time enrollment does not have to take place in consecutive terms.

Adequate fulfillment of the residence requirement shall be determined by the Graduate School.

LANGUAGE REQUIREMENTS

The foreign language requirement is determined by the student's doctoral committee, subject to the same approval required for the graduate study program, and is so designated in the official doctoral program. Foreign language requirements must be completed before the oral preliminary examination.

PRELIMINARY EXAMINATIONS

The student working toward a doctoral degree must pass a comprehensive preliminary examination. The purpose of this exam is to determine the student's understanding of his or her major and minor fields and also to assess the student's capability for research. Students must enroll for a minimum of 3 credits during terms in which they undertake departmental written or oral preliminary examinations.

WRITTEN COMPREHENSIVE EXAMINATION

Most programs require a written comprehensive examination to be taken before the oral preliminary examination. If a written examination is required, it must be completed prior to the oral preliminary examination. The content, length, timing, passing standard, and repeatability of this examination are at the discretion of the major department. The general rules and structure of this examination, however, must be provided in writing to all candidates for this examination and a current copy of these guidelines must be on file with the Graduate School. Copies of the written examination (questions and student's answers) must be available to all members of the student's doctoral committee at

least one week prior to the oral preliminary examination.

ORAL PRELIMINARY EXAMINATION

The oral preliminary examination is taken near the completion of the student's course work. The oral examination is conducted by the student's doctoral committee, and should cover the student's knowledge in his or her major and minor subjects. The exam may cover the student's proposed research topic, although no more than one-half the time should be devoted to specific aspects of the proposal. The examination should be scheduled for at least two hours, and the exam date must be scheduled in the Graduate School at least one week in advance. If more than one negative vote is recorded by the examining committee, the candidate will have failed the oral examination. No more than two re-examinations are permitted by the Graduate School, although academic units may allow fewer re-examinations.

At least one complete academic term must elapse between the time of the preliminary oral examination and the final oral examination. If more than five years elapse between these two examinations, the candidate will be required to take another preliminary oral examination.

THESIS

Each candidate for the PhD degree must submit a thesis embodying the results of research and giving evidence of originality and ability in independent investigation. The thesis must be a real contribution to knowledge, based on the candidate's own investigation. It must show a mastery of the literature of the subject and be written in creditable literary form. The preparation of an acceptable thesis will require at least one full-time academic year. The booklet, *Thesis Guide: Preparing a Thesis or Dissertation at OSU*, is available electronically on the Web at <http://gradschool.oregonstate.edu/success/thesis-guide>.

The results from studies conducted using human subjects without obtaining Institutional Review Board approval shall not be used to satisfy master's thesis or doctoral dissertation requirements. For more information, please send an email to irb@oregonstate.edu or visit the IRB website at <http://oregonstate.edu/research/irb/>.

A formal thesis proposal meeting is recommended but not required by the Graduate School; however, it is required for some majors. This meeting should be held with the student's doctoral committee prior to the start of any substantial doctoral thesis research.

When scheduling their final oral examinations, doctoral students are required to submit the pretext pages of

their dissertations to the Graduate School at least two weeks prior to the final oral examination. Pretext pages include the abstract, copyright (optional), title page, approval page, acknowledgment page, contribution of authors, table of contents, list of figures, tables, appendices, dedication (optional), and preface (optional). It is expected that students will distribute examination copies of their thesis to all committee members, including the Graduate Council representative, sufficiently early to permit thorough review of the thesis prior to the student's final oral examination.

Within six weeks after the final oral examination or before the first day of the following term, whichever comes first, upload one PDF copy of your thesis, without signatures, electronically to ScholarsArchive and submit the signed ETD submission approval form with a copy of the title page to the Graduate School. If final submission requirements are after the initial six-week period, the student may be subject to re-examination. Please refer to the Graduate School's website for complete details (<http://gradschool.oregonstate.edu/success/thesis-guide>).

Signatures on the ETD submission approval form can be electronic, signed, scanned and emailed or faxed. The thesis will not be accepted for graduate requirements until it has received approval by the graduate dean, which the thesis editor will get.

FINAL EXAMINATION

After completion of or while concurrently registered for all work required by the program, the student must pass a final doctoral examination that may be written in part but must include an oral examination. The final oral examination must be scheduled in the Graduate School office at least two weeks prior to the date of the examination. All incomplete course work appearing on the program of study must be completed prior to scheduling the final oral examination.

The final oral examination consists of a public thesis defense followed by a closed session of the examining committee with the candidate. Under normal circumstances, the final oral examination should be scheduled for two hours.

All members of the student's graduate committee must approve the scheduling of the final examination.

It is expected that the thesis defense portion of the final oral exam be open to all interested persons and should be limited to one hour. After the open portion of the exam, the examining committee should exclude all other persons and continue with the examination of the candidate's knowledge of his or her field and the evaluation of the candidate's performance.

If the department favors a more elaborate presentation, it should be scheduled as a separate seminar. In any case, the time involved for the open presentation may not impinge upon time required for the examining committee to conduct appropriate, iterative oral inquiry with the candidate, to evaluate the candidate's performance, and to deliberate fully within the time constraints of the scheduled oral examination.

The examining committee consists of the student's doctoral committee and any additional members, including professors from other institutions, whom the major department may recommend. In the oral examination, the candidate is expected to defend the thesis and show a satisfactory knowledge of his or her field. If more than one negative vote is recorded by the examining committee, the candidate will have failed the examination. No more than two re-examinations are permitted by the Graduate School, although academic units may permit fewer re-examinations.

The final oral examination must be taken within five years after the oral preliminary examination. If more than five years elapse, the candidate will be required to take another oral preliminary examination.

DOCTOR OF EDUCATION REQUIREMENTS

The EdD program is a degree program with a major in education. It is intended for the educational professional whose career path is that of educational or teaching specialist, administrator, or other practitioner in the public schools, postsecondary institutions of higher education, or in business and industry. Its focus is on the application of knowledge to learning and teaching environments in public and private settings. The EdD program is designed to prepare educational leaders in community college education, middle-level education, or related educational settings.

A masters' degree in education or a related field, or equivalent to a master's degree in postbaccalaureate course work is required for admission. In addition, the College of Education requires the following:

1. minimum professional experience as defined by each program,
2. letter or statement of professional objectives for doctoral study and area of specialization within education,
3. three letters of recommendation, and
4. either the Graduate Record Examination or the Miller Analogies Test.

Applicants to the EdD program must have significant experience in an education or education-related setting such as teaching, school administration, curriculum specialist, instructional specialist,

child/youth counselor, supervisor; or in a setting where the primary function is education.

In general, the following requirements are in effect for the EdD:

1. A minimum of 108 credits beyond the baccalaureate degree.
2. Effective fall 2005, all graduate student programs of study submitted to the Graduate School must consist of, at a minimum, 50 percent graduate stand-alone courses. The remaining credits may be the 500 component of 400/500 slash courses.
3. Completion of the same residence requirements as listed for the PhD degree.
4. A dissertation of no less than 24 credits.
5. A mentored internship in an appropriate work setting for a minimum of 12 credits.
6. A minimum of 48 graduate credits in an area of specialty in education.
7. Completion of 24 credits of core seminars.
8. Completion of the core courses in research.

Procedures and requirements for preliminary and final examinations and thesis are the same as those for the doctor of philosophy degree.

GRADUATE FELLOWSHIPS, SCHOLARSHIPS, AND FINANCIAL AID

GRADUATE FELLOWSHIPS AND SCHOLARSHIPS

A number of Oregon State University fellowships and scholarships sponsored by industry, foundations and government agencies are available to superior students for graduate study in various graduate programs at OSU. For a listing of many these fellowships and scholarships, visit the Scholarship Management System database at https://scholarship.ucsdm.oregonstate.edu/prod/search_schol.php.

For more information about scholarships and fellowships in the database above, including application instructions, as well as additional opportunities in individual programs, contact the individual program of interest.

Students interested in general information regarding graduate student funding opportunities are encouraged to explore Financing Your Education on the Graduate School's website: <http://gradschool.oregonstate.edu/finance>.

GRADUATE STUDENT EMPLOYMENT

Each year, OSU receives grants from federal and state agencies, public and private foundations, and business and industry to support institutional and individual

projects. Funding is awarded to the various departments in most academic colleges and to other research organizations on campus, including experiment stations, centers and institutes. Many of these grants include financial support for graduate students. Interested students should direct inquiries and applications to the department concerned.

Graduate students may be employed as Graduate Teaching or Graduate Research assistants by departments on campus. In addition to monthly stipends, graduate assistants appointed at .20 FTE or above are eligible for a tuition and fee subsidy.

In addition to graduate assistantships, graduate students may be appointed to student hourly positions on campus. These appointments are not eligible for a tuition or fee subsidy.

The maximum combined appointment FTE for all jobs in the OUS system is .49 FTE.

For more information on student employment, contact the department of interest or the Office of Human Resources.

FINANCIAL AID FOR GRADUATE STUDENTS

The OSU Office of Financial Aid and Scholarships administers federal financial aid programs to assist graduate students with meeting the cost of higher education. To determine eligibility for specific federal aid programs at OSU, graduate students are required to complete the Free Application for Federal Student Aid (FAFSA) each year. Graduate students must be degree-seeking or in an approved certificate program and enrolled at least half-time (5 credits) to qualify for financial aid. Graduate students are not eligible for federal Title IV grants or subsidized loans. Students in graduate certificate programs are only eligible for aid for courses required for their certificate program.

For additional information about Financial Aid for graduate students, visit <http://oregonstate.edu/financialaid/>, or contact the OSU Office of Financial Aid and Scholarships.

GRADUATE RESEARCH SUPPORTING SERVICES

For information on Graduate Student Success, please see the Graduate School's Graduate Student Success Guide <http://gradschool.oregonstate.edu/success>.

COMPARATIVE HEALTH SCIENCES

Graduate School
A300 Kerr Administration Building
541-737-4881
Website: <http://gradschool.oregonstate.edu>

Graduate Major

Comparative Health Sciences (MS, PhD)

Graduate Options
Biomedical Sciences
Clinical Sciences

Graduate Minor

Comparative Health Sciences

The Comparative Health Sciences graduate major is an interdisciplinary program administered by the Graduate School. Participating colleges include Veterinary Medicine, Public Health and Human Sciences, Pharmacy, and the Graduate School.

For further information about the graduate major, see the proposal at <https://secure.oregonstate.edu/ap/cps/proposals/view/84096>.

MS degree students complete a total of 45 graduate credits, including 12 thesis credits.

PhD degree students complete a total of 108 graduate credits beyond the bachelor's or professional (DVM, MD) degree, including at least 36 credits of non-blanket course work.

All students complete the core curriculum and at least two electives for a total of 12 credits. Student must also complete the Biomedical Sciences option.

Required Core

Research Perspectives Lab Rotations (3)
ST 511. Methods of Data Analysis (4)
Biomedical Ethics (1)
Grant Application Preparation (1)
Seminar (1)

Electives

BB 550. General Biochemistry (3)
MCB 524. Molecular and Cellular Biology Techniques (1)
(New course) Introduction to Bioinformatics
(New course) Introduction to Epidemiology
(New course) Introduction to Genomics
(New course) Introduction to Immunology

BIOMEDICAL SCIENCES OPTION

Students must also complete the Biomedical Sciences option:

MS Students

VMB 521. Animal Models (3)
VMC/VMB 501. Research (5)
VMC/VMB 503. Thesis (12)
VMC/VMB 507/607. Seminar (1)
Electives (24)

PhD Students:

VMB 521. Animal Models (3)
VMB 603. Thesis (36)
VMB 671. Molecular Tools (3)
VMB 607. Seminar: Dissertation Defense (1)
Electives (53)

CLINICAL SCIENCES OPTION

For more details, see the Graduate School.

COMPARATIVE HEALTH SCIENCES GRADUATE MINOR

For more details, see the Graduate School.

ENVIRONMENTAL SCIENCES

Andrew Blaustein, Program Director

Environmental Sciences Graduate

Program
2046 Cordley Hall
Oregon State University
Corvallis, OR 97331
541-737-5095
Email: ensc@oregonstate.edu

Graduate Major

Environmental Sciences
(MA, MS, PhD, PSM)

Graduate Minor

Environmental Sciences

Environmental sciences consists of curricula that foster interdisciplinary education for students seeking to better understand earth systems. The undergraduate curriculum leads to the BS degree in Environmental Sciences and requires students to complete courses that develop a broad base of knowledge in basic science disciplines, social sciences, and an area of specialization. A minor in environmental sciences is also available for those undergraduate students completing their degrees in other fields. The theme of the Environmental Sciences Program is central to the mission of OSU and reflects the strengths of OSU and other agencies and institutions in Corvallis and throughout the state of Oregon. The BS degree in Environmental Sciences provides excellent training for careers with agencies responsible for environmental protection and natural resource use, consulting firms, and those seeking opportunities for graduate studies.

ENVIRONMENTAL SCIENCES (MA, MS, PhD, PSM)

Graduate Areas of Concentration

Biogeochemistry, ecology, environmental education, natural resources, quantitative analysis, social science, water resources

The Environmental Sciences Graduate Program provides curricula leading to

MA, MS and PhD degrees in Environmental Science. The curricula integrates thinking across disciplines, especially life, physical, and social sciences. Environmental science explores natural processes on earth and their alteration by human activity. OSU has exceptional strength in many of the disciplines, including science, agriculture, forestry, engineering, public health, liberal arts, social science, and oceanography and atmospheric science. Strength in these disciplines allows the ES Graduate Program to provide high-quality interdisciplinary education for environmental scientists and continuing postgraduate educational opportunities to scientists who are already active in the field. The degrees administered by the program are OSU's contribution to the Joint-Campus Graduate Program for Environmental Sciences, Studies, and Policy, which links environmental graduate programs among the major research universities in Oregon.

The ES Graduate Program develops scientists who will be able to analyze and understand environmental systems, predict environmental change, and participate in the management of the environment. Each student completing a major in the ES Graduate Program will perform research and complete a thesis, dissertation, or research project. Each student will complete a core of ES graduate courses that will integrate concepts across the physical sciences, life sciences, and social sciences. Each student will also develop depth in a carefully designed, interdisciplinary area of concentration or track. Tracks that are currently available include ecology, biogeochemistry, social science, quantitative analysis, water resources, and environmental education. Methods and numerical skill courses, electives, and thesis make up the remainder of a student's program.

Students in the ES Graduate Program may choose advisors from faculty members already appointed at OSU, as well as other scientists who apply and are accepted in the environmental sciences graduate faculty. The Environmental Sciences Graduate Program fosters interdisciplinary education, and seeks connections between institutions.

For more information, contact Dr. Andrew Blaustein, Director, Environmental Sciences Graduate Program, Oregon State University, Corvallis, OR 97331-2904, or email: esgp@oregonstate.edu.

Degree Requirements

MA and MS Degrees (45 credits)

Environmental science core courses (9)
Methods and numerical skills courses (6)
ES area of concentration (Track) (15)
Elective courses (3–9)
Thesis (6–12)

Note: The MA degree requires proficiency in a foreign language.

PhD Degree (108 credits)

Environmental sciences core courses (10)
 Methods and numerical skills courses (9)
 ES area of concentration (Track) (30)
 Elective courses (3–23)
 Thesis (36–56)
 PSM Degrees Requirements (54 credits)
 Environmental science core courses (10)
 Methods and numerical skills courses (4)
 Area of concentration (16)
 Professional courses (18)
 Internship (6)

**PROFESSIONAL SCIENCE
 MASTER'S DEGREE IN
 ENVIRONMENTAL SCIENCE**

Andrew Blaustein, *Director*

Environmental Science Program

2046 Cordley Hall

Corvallis, OR 97331

541-737-5095

Email: renee.freeman@oregonstate.edu

Website: <http://psm.science.oregonstate.edu/>

The worlds of science and business are increasingly interconnected, creating strong demand for environmental professionals who can create partnerships for research, policy, and public outreach initiatives. The Professional Science Master's (PSM) in Environmental Science at OSU is the first program of its kind in the Pacific Northwest and was created with the help of professional affiliates employed in leadership roles in industry and agencies concerned with the environment. Special training in business management, communications, and ethics complements the core science curriculum, and students are required to complete an internship in lieu of thesis research. Several federal research laboratories are located in the Corvallis region, including the U.S. Environmental Protection Agency, the U.S. Department of Agriculture, the U.S. Forest Service, and the Bureau of Land Management.

The PSM program can usually be completed in two years, based on full-time study and at least 54 credits. Core environmental science courses form the foundation of this program by providing students with basic skills in environmental research methods and analysis (ENSC 508, ENSC 515, ENSC 520, and a 3-credit core elective). Course work in areas of concentration give focus and identity to each student's curriculum and allows for flexibility in response to changing employment demands. Areas of concentration are currently offered in biogeochemistry, ecology, environmental education, quantitative analysis, social science, natural resources, water resources, and sustainable natural resources. The sustainable natural resources concentration is offered online as an 18-unit block during summer term. Numerical skills courses expose students to research

design, statistical analysis, modeling, survey design, or other quantitative and qualitative techniques. Professional courses are required in communication, research ethics, and business management (PSM 513, PSM 565, PSM 566, PSM 567, COMM 550 and PHL 547). These courses are designed to be taken in sequence during the first academic year. Students are required to complete a 3 to 6 month internship (6–12 credits) in lieu of thesis research (ENSC 510).

For general information about PSM programs, contact the PSM Director, 2082 Cordley Hall, Corvallis OR 97331, 541-737-5259; email: kirstin.carroll@oregonstate.edu.

**ENVIRONMENTAL SCIENCES
 GRADUATE MINOR**

For more details, see the departmental advisor.

COURSES

ENSC 101. ENVIRONMENTAL SCIENCES ORIENTATION (1). Introduction to the Environmental Sciences Program and related professional and educational opportunities. Recommended for all freshman and first-year transfer environmental sciences majors, but open to all students interested in learning about career options in the environmental sciences. Graded P/N.

ENSC 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ENSC 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor and departmental approval required.

ENSC 402. INDEPENDENT STUDIES (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 405. READING AND CONFERENCE (1-12). This course is repeatable for a maximum of 12 credits. **PREREQS:** Instructor and departmental approval required.

ENSC 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 410. INTERNSHIP (1-12). Supervised practical experience working with professionals at selected cooperating institutions, agencies, laboratories, or companies. Graded P/N. This course is repeatable for a maximum of 12 credits. **PREREQS:** Instructor and departmental approval required.

ENSC 479. *^ENVIRONMENTAL CASE STUDIES (3). Improves students' ability to ask questions, gather and synthesize information, and communicate ideas on environmental topics. Instruction and information necessary for the course is entirely Web based. (Bacc Core Course) (Writing Intensive Course) **PREREQS:** One year of college biology or chemistry and junior standing required.

ENSC 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ENSC 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

ENSC 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

ENSC 510. INTERNSHIP (1-12). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

ENSC 515. ENVIRONMENTAL PERSPECTIVES AND METHODS (3). Unique perspective or method each quarter. Possibilities include: remote sensing, modeling over a range of scales in time, space, and levels of system organization; and risk analysis.

ENSC 520. ENVIRONMENTAL ANALYSIS (3). Develop analytical thinking, explore analytical approaches, enhance writing skills, and gain experience in oral communication about environmental issues.

ENSC 530. RESEARCH PROFILES (1-2). Faculty and graduate student environmental research presentations.

ENSC 599. SELECTED TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ENSC 601. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

ENSC 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENSC 630. RESEARCH PROFILES (1-2). Faculty and graduate student environmental research presentations.

ENSC 699. SELECTED TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

INTERDISCIPLINARY STUDIES

David A. Bernell, *Director*
MAIS Program
School of Public Policy
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Graduate Major

Master of Arts Interdisciplinary Studies (MAIS)

Graduate Areas of Concentration
Selected from three fields offering graduate majors and minors

INTERDISCIPLINARY STUDIES (MAIS)

Graduate Areas of Concentration
Selected from three fields offering graduate majors and minors

The Master of Arts in Interdisciplinary Studies (MAIS) degree program is designed to permit students to formulate programs that integrate work from three separate disciplines. Breadth of study is important in designing the program. A research paper or thesis offers the opportunity to integrate the three disciplines.

Any graduate major or minor may serve as a discipline or field for this degree. Two of the three fields may be from one department if the areas of concentration within these two fields are different.

Program participation varies from year to year.

Graduate programs currently participating in this degree are:

- adult education major and minor 2070
- agricultural education major and minor 1050
- animal science major and minor 1250
- anthropology minor 8600
- applied anthropology major and minor 8640
- applied economics major and minor 1290
- applied ethics major and minor 9580
- art minor 8800
- biochemistry and biophysics major and minor 5060
- botany and plant pathology major and minor 5160
- civil engineering¹ major and minor 3060
- computer science major and minor 3070
- crop science major and minor 1200

- design and human environment major and minor 4410
- education major and minor 2310
- English major and minor 8900
- ethnic studies minor 8940
- exercise and sport science major and minor 7640
- fisheries science major and minor 1300
- foreign languages and literatures minor 8950
- forest ecosystems and society major 1100
- geography major and minor 5450
- geology¹ major and minor 5500
- gerontology¹ minor 4370
- history minor 9000
- history of science¹ major and minor 5440
- horticulture major and minor 1450
- human development and family studies¹ major and minor 4470
- industrial engineering major and minor 3190
- international agricultural development¹ minor 1070
- mathematics major and minor 5600
- music minor 9500
- nutrition¹ major and minor 4660
- ocean, earth and atmospheric sciences¹ major and minor 5001
- philosophy minor 9550
- physics major and minor 5900
- political science minor 9600
- psychology minor 9560
- queer studies minor 8777
- rangeland sciences major and minor 6220
- rural studies¹ minor 1080
- sociology¹ minor 9800
- soil science major and minor 1600
- speech communication minor 9850
- statistics major and minor 6150
- sustainable forest management major 1090
- wildlife science major and minor 1750
- women, gender, and sexuality studies major and minor
- wood science major and minor 3690

¹ Not as a primary area of concentration.

Admission

The applicant must satisfy university admission requirements at the graduate level and must gain acceptance at the point of admission by the departments offering the fields that will make up the program.

Administration

The Graduate School will handle general administration and recordkeeping. Students with general questions about the MAIS degree are encouraged to confer with the director of the MAIS graduate program.

The student should select a committee in consultation with the department/school chair of the emphasized field or

with his or her designated representative. With the advice of the committee chair, the student will select a committee member from each of the remaining two fields. The student will select the fourth committee member, a Graduate Council representative, from a list of names to be obtained in the Graduate School office. All members of the committee must be on the graduate faculty.

Before the completion of 18 credits of graduate course work, the student must file the official program form, approved by the committee. Program planning meetings are required, and the student has the responsibility for arranging the committee meetings necessary in the planning of the program. In the event that the student subsequently desires to change one or more disciplines on his or her program, the student must file a change in degree program with the Graduate School and schedule another program meeting in order to gain committee approval.

PROGRAM REQUIREMENTS

The Master of Arts in Interdisciplinary Studies (MAIS) degree is granted for attainment of broad, advanced knowledge and achievement integrated from three fields of study. Any graduate major or minor may serve as a field for this degree. Two of the three fields may be from one department if the areas of concentration within these two fields are different. A minimum of 9 credits in each of the three fields of study is required. The degree requires a minimum of 49 credits, including 4 credits of course work on interdisciplinary research methods.

No more than 21 credits (excluding thesis or research paper credit) may be taken in any field unless the total program exceeds 49 credits. There is no foreign language requirement. No more than 3 credits of blanket-numbered courses in each field of study may be used in the program; thesis credits (Option A) or research paper credits (Option B) are exempt from this limitation. The student's committee consists of four members of the graduate faculty—one from each of the three fields—and a Graduate Council representative. A formal program meeting must be held prior to the completion of 18 graduate credits. A final oral examination is required.

Two options under the program:

Option A: Thesis option. The thesis must coordinate work in the three fields. The requirement is 6 to 9 credits of Thesis 503. The thesis advisor must be a member of the graduate faculty authorized to direct theses.

Option B: Research paper option. The research paper must integrate work from at least two of the three fields. The requirement is 4 to 7 credits, registered

as Research 501, Reading and Conference 505, or Projects 506.

COURSES

IST 420. GRADUATE SCHOOL PREPARATION (1). Applying for graduate or professional school can be a daunting task. How and where to apply, how to choose an advisor, what to look for in a school, and how to obtain funding are hurdles to overcome during the application process. Supplemental materials will be provided as part of the course materials.

IST 499. SPECIAL TOPICS (4). PREREQS: Junior or senior standing, preferably with GPA greater than 3.0.

IST 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

IST 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

IST 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

IST 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

IST 511. INTRODUCTION TO INTERDISCIPLINARY GRADUATE STUDIES (1). First term graduate seminar for master's students in interdisciplinary studies to design their program of study; discover and access library and other university resources related to their fields of study; and practice synthesizing aspects of three differing fields.

IST 512. APPLYING AN INTERDISCIPLINARY PERSPECTIVE (3). Students will develop knowledge and skills in theory, research methods, and practice of approaching problems, issues, or events from an interdisciplinary perspective.
PREREQS: IST 511

IST 520. RESPONSIBLE CONDUCT OF RESEARCH (1). Covers 10 topics in responsible conduct of research: ethical decision making; human subjects; animal welfare; data acquisition, sharing, and ownership; research misconduct; conflicts of interest; authorship; peer review; mentor/trainee responsibilities; and collaborative science. Useful to all students who conduct scholarly activity. **PREREQS:** Graduate standing

IST 599. SPECIAL TOPICS (4). PREREQS: Minimum Course Prerequisites 1. Submission of an AAUS/OSU Scientific Diving Application and Diving Medical History to the OSU DSO 2. Submission of an AAUS/OSU Medical Evaluation of Fitness for Scuba Diving to the OSU DSO showing no contraindications for diving 3. Ability to complete the OSU scientific diver swim evaluation 4. Advanced Open Water certification from a recognized training agency (Rescue Diver strongly preferred). Experience in lieu of training may be recognized by the DSO 5. Current certifications in CPR, First Aid, AED, and Emergency Oxygen Administration 6. Proof of diving accident insurance (Divers Alert Network or equivalent) 7. Student must provide basic snorkeling gear, exposure protection, suitable cutting tool, light, slate, and underwater timing device

IST 607. CAPSTONE SEMINAR (3). Provides a culminating experience required for all graduate students pursuing the Graduate Certificate in College and University Teaching and for other graduate students seeking a structured opportunity to develop their teaching portfolio.
PREREQS: (AHE 547 and AHE 553)

IST 610. INTERNSHIP (3). Provides a framework for the in-depth internship experiences required of all graduate students pursuing the Graduate Certificate in College and University Teaching and for other graduate students seeking a structured opportunity to reflect on and improve their teaching. **PREREQS:** (AHE 547 and AHE 553)

MOLECULAR AND CELLULAR BIOLOGY

Barbara J. Taylor, Director
Molecular and Cellular Biology
3021 Agricultural and Life Sciences Bldg.
Oregon State University
Corvallis, OR 97331
541-737-3799
Email: taylorb@science.oregonstate.edu
and millimag@cgrb.oregonstate.edu
Website: <http://www.mcb.oregonstate.edu>
Website: <http://psm.science.oregonstate.edu/applied-biotechnology>

AFFILIATE FACULTY

Over ninety faculty members drawn from 20 departments in seven colleges participate in the MCB program.

Graduate Majors

Applied Biotechnology (PSM)
Molecular and Cellular Biology (MS, PhD)

Graduate Areas of Concentration

Bioinformatics
Biotechnology
Cell Biology
Developmental Biology
Genome Biology
Molecular Biology
Molecular Pathogenesis
Molecular Virology
Plant Molecular Biology
Structural Biology

Graduate Minor

Molecular and Cellular Biology

The Molecular and Cellular Biology Program provides students with comprehensive interdisciplinary training in molecular and cellular biology while reserving sufficient flexibility for students to specialize in their areas of interest. The elements of the core curriculum include courses in molecular genetics and cell structure and function, bioinformatics and genomics, scientific skills and ethics, along with research rotations with individual faculty members. Additional course work is custom-tailored to the individual student's interests and needs. Each program requires 36 units of graduate-level course work, participation in seminar programs, two quarters of supervised teaching experience, written and oral preliminary examinations, supervision by an individual committee of five faculty members, and presentation of a thesis containing the results of publishable original research.

The program also offers access to all of the participating faculty as potential research advisors. Students do three research rotations in the first year and select their advisor from over 90 faculty members in the 20 participating depart-

ments in seven colleges. Therefore, the MCB Program lowers interdisciplinary barriers and allows the students to select the advisors that most closely match their interests after they have been on campus for one or more terms.

GRADUATE MAJORS

APPLIED BIOTECHNOLOGY GRADUATE MAJOR (PSM)

Barbara J. Taylor, Director
Molecular and Cellular Biology
3021 Agricultural and Life Sciences Bldg.
Oregon State University
Corvallis, OR 97331
541-737-3799
Email: taylorb@science.oregonstate.edu
and millimag@cgrb.oregonstate.edu
Website: <http://www.mcb.oregonstate.edu>
Website: <http://psm.science.oregonstate.edu/applied-biotechnology>

The worlds of science and business are increasingly interconnected – creating strong demand for individuals who can bridge these two disciplines. Biomedical industries and start-up companies need employees who can combine their scientific and technical knowledge with good business management and communication skills. The Professional Science Master's (PSM) in Applied Biotechnology at OSU is the first program of its kind in the Pacific Northwest and was created with the help of professional affiliates employed in leadership roles in the biotech industry. The objective of this degree is to train students to be able to function effectively in industrial environments. Special training in business management, communications, and ethics complement core science curriculum, and students are required to complete an internship in lieu of thesis research.

The PSM program can usually be completed in two years, based on full-time study and at least 54 credit hours. Core lecture courses provide the conceptual framework necessary in the biotechnology sector. Microbial genetics, structure and function of eukaryotic cells, eukaryotic molecular genetics, and cell signaling and development are some of the topics that are covered (MCB 554, MCB 555, MCB 556, and MCB 575). An intensive laboratory experience (MCB 525) is a 2-week summer course that has attracted students from around the country for 8 years to learn molecular biology theory and practice. Bioinformatics training is also an option. Approved electives in an Area of Concentration give focus and identity to each student's curriculum and allow for flexibility in response to changing employment demands. Current Areas of Concentration include: Bioinformatics, Biotechnology, Cell Biology, Developmental Biology, Genome Biology, Molecular Biology, Molecular

Pathogenesis, Molecular Virology, Plant Molecular Biology and Structural Biology. Professional courses are required in communication, research ethics, and business management (PSM 513, PSM 565, PSM 566, PSM 567, COMM 550 and PHL 547). These courses are designed to be taken in sequence during the first academic year. Students are required to complete a 3 to 6 month internship (6-12 credits) in lieu of thesis research (MCB 510).

For general information about PSM programs, contact the PSM Director, Barbara J. Taylor, 3021 Agricultural and Life Sciences Building, 541-737-3799, taylorb@science.oregonstate.edu and milimlag@cgrb.oregonstate.edu.

Degree Requirements(54 credits)

Core science courses (19)
Approved electives (11)
Professional courses (18)
Internship (6)

MOLECULAR AND CELLULAR BIOLOGY (MS, PhD)

Graduate Areas of Concentration
Bioinformatics, biotechnology, cell biology, developmental biology, genome biology, molecular biology, molecular pathogenesis, molecular virology, plant molecular biology, structural biology

MCB doctoral students do research rotations in three laboratories during the first year, and then carry out their thesis research in subsequent years under the direction of a member of the MCB faculty. The MCB Program lowers interdisciplinary barriers and allows each individual the opportunity to select the most suitable advisor and committee.

MOLECULAR AND CELLULAR BIOLOGY GRADUATE MINOR

Graduate Areas of Concentration
Bioinformatics, biotechnology, cell biology, developmental biology, genome biology, molecular biology, molecular pathogenesis, molecular virology, plant molecular biology, structural biology

COURSES

MCB 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 99 credits.

MCB 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

MCB 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 99 credits.

MCB 507. SEMINAR (1-16). This course is repeatable for a maximum of 99 credits.

MCB 508. WORKSHOP (1-16). This course is repeatable for a maximum of 99 credits.

MCB 509. PRACTICUM (1-16). This course is repeatable for a maximum of 99 credits.

MCB 510. INTERNSHIP (1-16). This course is repeatable for a maximum of 99 credits.

MCB 511. RESEARCH PERSPECTIVES IN MOLECULAR AND CELLULAR BIOLOGY (3). Provides graduate students with an in-depth exposure to faculty members at OSU involved in

molecular and cellular biology and their specific fields of research.

MCB 524. MOLECULAR AND CELLULAR BIOLOGY TECHNIQUES (1). Modern methods for manipulation of cellular macromolecules. Recombinant DNA technology and protein chemistry methods will be covered. Includes daily lectures over a two-week period. Lec/lab. Graded P/N. **PREREQS:** BB 451 or equivalent. May not be taken concurrently with MCB 525.

MCB 525. TECHNIQUES IN MOLECULAR AND CELLULAR BIOLOGY (3). An intensive laboratory course introducing modern methods for the manipulation of cellular macromolecules. Recombinant DNA technology, protein chemistry, and in situ hybridization methods presented in a format that emphasizes experimental continuity. The course requires two weeks of intensive full-time involvement. **PREREQS:** Departmental approval required.

MCB 530. INTRODUCTION TO POPULATION GENETICS (3). Genetic polymorphisms, inbreeding, genetic drift, population subdivision and gene flow, mutation and selection. Emphasis on applied rather than theoretical questions. Offered alternate years. **PREREQS:** BI 311 and ST 351 and ST 352

MCB 535. GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK (3). A multidisciplinary course that examines the scientific, social, political, economic, environmental, and ethical controversies surrounding agricultural and natural resource biotechnologies. Lec/lab/rec. **CROSSLISTED** as BI 435/BI 535, FES 435/FES 535, TOX 435/TOX 535.

MCB 541. PLANT TISSUE CULTURE (4). Principles, methods, and applications of plant tissue culture. Laboratory is important part of course. Topics include callus culture, regeneration, somaclonal variation, micropropagation, anther culture, somatic hybridization, and transformation. **CROSSLISTED** as HORT 441/HORT 541, PBG 441/PBG 541. **PREREQS:** (BI 311 and BOT 331) or HORT 430 or PBG 430

MCB 554. GENOME ORGANIZATION, STRUCTURE, AND MAINTENANCE (4). How diverse organisms store their individual sets of genetic information (genomes). Evolution of genomes and gene families. Structures of DNA and chromatin. Biochemical and regulatory pathways that protect cellular genomes against environmental and endogenous damage and ensure transmission of faithful copies to progeny. Remodeling of genomes by recombination and transposition. **CROSSLISTED** as TOX 554. **PREREQS:** BI 311 (genetics or equivalent) and (BB 450 and BB 451 and BB 452) or (BB 490 and BB 491 and BB 492) or equivalent.

MCB 555. GENOME EXPRESSION AND REGULATION (4). Prokaryotic and eukaryotic systems will be used to describe recent advances in understanding transcriptional and posttranscriptional control mechanisms. Topics include: microbial, yeast and mouse model systems; transcriptional control mechanisms; RNA processing, silencing and microRNAs; protein synthesis and posttranslational modification; microarray- and mass spectrometry-based expression genomics. **PREREQS:** BB 451 or equivalent.

MCB 556. CELL AND DEVELOPMENTAL BIOLOGY (4). Examination of molecular and structural elements in eukaryotic cells and their relationship to function and development. Topics include nuclear organization, membranes, organelles, intracellular sorting, cell energetics, cell signaling, cell motility, cell division cycle, and developmental processes of selected model organisms. Critical reading and writing skills will be emphasized. **PREREQS:** BB 450 and BB 451 (biochemistry) or equivalent; BI 311 (genetics) or equivalent. Recommended: BI 460 (cell biology) or equivalent; MCB 554 and MCB 555.

MCB 557. SCIENTIFIC SKILLS AND ETHICS (3). Offers instruction, guest lectures and case-study based discussions of ethical issues relevant to scientists on topics such as mentoring, best practices of conducting research, research misconduct and compliance, intellectual property, peer review, ethical use of animal and human subjects and managing conflicts of interest. Training in the preparation and presentation of scientific seminars and grant writing. **PREREQS:** Graduate standing.

MCB 563. CANCER AND CHEMOPREVENTION (2). A summary of mechanisms of cancer progression, how cancer is detected, and introduction to chemoprevention using targeted therapy and alternative medicine. **PREREQS:** BB 451 and BI 314 and BI 460 or equivalent courses.

MCB 564. RECEPTORS AND SIGNAL TRANSDUCTION: ADVANCED TOPICS (3). Advanced concepts and recent developments in receptor pharmacology. Topics include receptor theory and regulation, and signal transduction pathways and functions. Offered alternate years. **CROSSLISTED** as PHAR 564. **PREREQS:** Instructor's approval required. Suggested prerequisite MCB 556 or PHAR 591.

MCB 565. MAMMALIAN MOLECULAR GENETICS (3). Covers general principles of the molecular genetics and functional genomics of mammalian organ system development. Advanced methodologies and emerging biotechnologies and their social, economic, political and cultural impacts will be discussed. **CROSSLISTED** as PHAR 565. **PREREQS:** BB 450 and BB 490 and MCB 556

MCB 575. COMPARATIVE GENOMICS (4). Principles of comparative genomics. Methods for genome assembly and annotation. Genomic approaches for the study of structural change, whole genome duplication, gene family evolution, gene networks, gene regulation and epigenetics. Lab topics include the analysis of next generation sequencing data and conducting comparative genome analyses. Lec/lab. **CROSSLISTED** as BOT 575. **PREREQS:** Students will require a basic working knowledge of cell and molecular biology and genetics. BI 314 and (BI 311 or CSS 430)

MCB 576. INTRODUCTION TO COMPUTING IN THE LIFE SCIENCES (3). Introduction to management of large datasets (e.g., nucleic acids, protein), computer programming languages, application of basic mathematical functions, and assembly of computational pipelines pertinent to life sciences. **CROSSLISTED** as BOT 476/BOT 576. **PREREQS:** Cell and molecular biology or genetics, or by approval of instructor. Familiarity with text editing software and unix/linux operating system is advantageous.

MCB 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

MCB 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

MCB 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

MCB 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

MCB 609. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

MCB 610. INTERNSHIP (1-9). Laboratory rotation. This course is repeatable for a maximum of 16 credits. **PREREQS:** MCB graduate students only.

MCB 620. DNA FINGERPRINTING (1). Principles and methods for producing and analyzing DNA fingerprints. Offered alternate years. **CROSSLISTED** as CSS 620 and PBG 620. **PREREQS:** BI 311 or CSS 430 or CSS 530 or PBG 430 or PBG 530 or HORT 430 or HORT 530 or equivalent.

MCB 621. GENETIC MAPPING (1). Principles and methods for constructing genetic maps comprised of molecular and other genetic markers. Offered alternate years. CROSSLISTED as CSS 621 and PBG 621. **PREREQS:** BI 311 or CSS 430 or CSS 530 or PBG 430 or PBG 530 or HORT 430 or HORT 530 or equivalent.

MCB 622. MAPPING QUANTITATIVE TRAIT LOCI (1). Principles and methods for mapping genes underlying phenotypically complex traits. Offered alternate years. CROSSLISTED as CSS 622 and PBG 622. **PREREQS:** CSS 590 or ST 513 or equivalent.

MCB 637. MOLECULAR HOST-MICROBE INTERACTIONS (3). Lecture and discussion-based presentation of the molecular bases for interactions between organisms. Addresses bacterial, algal, and fungal symbionts of eukaryotes and considers pathogenesis, commensalism, and mutualism. A focus on the evolution of host-microbe interactions is included.

MCB 651. MOLECULAR BASIS OF PLANT PATHOGENESIS (3). Analysis of current concepts in the physiology, biochemistry, and genetics of host-parasite interactions. Topics covered include specificity, recognition, penetration, toxin production, altered plant metabolism during disease, resistance mechanisms and regulatory aspects of gene expression during host-parasite interactions. Offered alternate years. CROSSLISTED as BOT 651. **PREREQS:** BOT 550

MCB 662. HORMONE ACTION (3). Mechanisms of action of peptide and steroid hormones and related compounds at the cellular level. CROSSLISTED as ANS 662, BB 662, PHAR 662. **PREREQS:** BB 451 or BB 551 or BB 492 or BB 592

MCB 668. BIOINFORMATICS AND GENOMICS (4). This course is divided into two 2-credit modules. First module teaches both the theory and practice of basic informatics techniques including sequence alignment, sequence searching, and the evolution of protein families and their applications at a genome-wide level (comparative genomics and functional genomics). Second module introduces the fundamental tools of bioinformatics (Linux, Perl) and bioinformatics algorithms necessary to process and analyze large datasets generated from high-throughput genomics experiments. The second module is structured in three sections: Programming Concepts (PC), Biological Applications (BA) and Biological Projects (BP). Programming Concepts lays the foundation for the later two sections. PC will teach students to work within a Linux operating system in a client/server environment. Students learn to create programs in Perl scripting language, which permeates modern bioinformatics applications. Relevant programming concepts are presented and code examples illustrated using biological data. BA builds on the PC foundation to provide "snapshots" of common bioinformatics methods. For example, formatting biological sequence data into standard file formats, parsing the output from common bioinformatics software, adding notations to biosequences, calculating common statistics associated with biosequences (i.e., reverse complementation of DNA sequence). BP uses the BA snapshots to develop more extensive projects. BP incorporates extensive coverage of theoretical and algorithmic concepts to explore a biological topic where dealing with the data in a computational and mathematical framework is essential.

MCB 669. GENOME EVOLUTION (3). Recent advances in our understanding of the evolutionary mechanisms by which genomes change over time will be the central focus of this course. Specific areas of study will include principles of molecular evolution and population genetics, phylogenetics, and recent topics in evolutionary genomics. Offered alternate years.

MCB 671. MOLECULAR TOOLS (3). Intended for personnel with some scientific background who are seeking basic- and advanced-level molecular biology knowledge and who wish to become involved with molecular biology-related and biotechnological research. CROSSLISTED as VMB 671. **PREREQS:** Graduate standing or advanced undergraduate standing in science or engineering, with permission of instructor.

MCB 699. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

WATER RESOURCES PROGRAMS

Mary Santelmann, Director
Water Resources Graduate Program
116 Gilmore Hall
Department of Geosciences
Oregon State University
Corvallis, OR 97331
541-737-1215
Email: santelmm@geo.oregonstate.edu
Website: <http://oregonstate.edu/gradwater/>

Graduate Majors

Water Resources Engineering (MS, PhD)

Graduate Areas of Concentration
Groundwater Engineering
Surface Water Engineering
Watershed Engineering

Water Resources Policy and Management (MS)

Graduate Area of Concentration
Water Resources Policy and Management

Water Resources Science (MS, PhD)

Graduate Area of Concentration
Water Resources Science

Graduate Minors

Water Resources

Graduate Areas of Concentration
Hydrology, Water Quality, Water Resources Planning and Management

Water Resources Engineering

Graduate Areas of Concentration
Hydrology, water quality, water resources planning and management

Water Resources Policy and Management

Graduate Areas of Concentration
Water Resources Policy and Management

Water Resources Science

Graduate Areas of Concentration
Water resources science

GRADUATE MAJORS:

WATER RESOURCES ENGINEERING (MS, PhD)

Graduate Areas of Concentration
Groundwater engineering, surface water engineering, watershed engineering

Core Courses (6 credits)

WRP/WRS 507. Seminar: Water Resources (1)

WRP/WRE/WRS 505. Reading and Conference: Water Resources Journal Club (1)

WRP/WRE/WRS 507. Seminar: Water Resources Seminar and Journal Club (1)

WRP 524. Socio-technological Aspects of Water Resources (3)

Groundwater Engineering

BEE 512. Physical Hydrology (3)

BEE/CE/GEO 514. Groundwater Hydraulics (3)

BEE 529. Biosystems Modeling Techniques (3)

BEE 533. Irrigation System Design (4)

BEE 542. Vadose Zone Transport (4)

ENVE 554. Groundwater Remediation (4)

GPH 665. Geophysical Field Techniques (3)

Surface Water Engineering

BEE 512. Physical Hydrology (3)

BEE 529. Biosystems Modeling Techniques (3)

BEE 533. Irrigation System Design (4)

BEE 544. Open Channel Hydraulics (4)

BEE 546. River Engineering (4)

CE 518. Groundwater Modeling (4)

CE 543. Applied Hydrology (4)

CE 641. Ocean Engineering Wave Mechanics (3)

FE 536. Forest Erosion Processes (3)

FE 537. Hillslope Hydrology (1-16)

Watershed Engineering

ATS 564. Interactions of Vegetation and Atmosphere (3)

BEE 512. Physical Hydrology (3)

BEE 525. Stochastic Hydrology (3)

BEE 529. Biosystems Modeling Techniques (3)

BEE 548. Nonpoint Source Pollution Assessment and Control (3)

BEE 549. Regional Hydrologic Modeling (3)

CE 517. Hydraulic Engineering Design (4)

CE 547. Water Resources Engineering I: Principles of Fluid Mechanics (4)

CE 548. Water Quality Dynamics (3)

CE 556. Environmental Assessment (4)

ENVE 521. Water and Wastewater Characterization (4)

ENVE 531. Transport and Fate of Organic Chemicals in Environmental Systems (4)

ENVE 532. Aqueous Environmental Chemistry (4)

FE 530. Watershed Processes (4)

FE 532. Forest Hydrology (4)

FE 535. Water Quality and Forest Land Use (3)

FS 561. Physiology of Woody Plants (3)

WATER RESOURCES POLICY AND MANAGEMENT (MS)

Graduate Areas of Concentration

Water resources policy and management

Core Courses (6 credits)

WRP/WRS 507. Seminar: Water Resources (1)
WRP/WRE/WRS 505. Reading and Conference: Water Resources Journal Club (1)

WRP/WRE/WRS 507. Seminar: Water Resources Seminar and Journal Club (1)

WRP 524. Socio-technological Aspects of Water Resources (3)

Methods and Numerical Skills**Select 9 credits from below:**

- CS 540. Database Management Systems (4)
 GEO 541. Spatio-Temporal Variation in Ecological and Earth Science (4)
 GEO 565. Geographical Information Systems (3)
 GEO 553. Research Evaluation Methods/EIS (3)
 ST 511. Methods of Data Analysis (4)
 ST 512. Methods of Data Analysis (4)
 ST 513. Methods of Data Analysis (4)
 ST 531. Sampling Methods (3)
 ST 573. Environmental Sampling (3)
 SOC 519. Applied Research Methods (4)

Basic Water Science**Select 6 credits from below:**

- ATS 520. Principles of Atmospheric Science (4)
 BEE 512. Physical Hydrology (3)
 BEE 514. Groundwater Hydraulics (3)
 CE 556. Environmental Assessment (4)
 CSS/SOIL 535. Physics of Soil Ecosystems (3)
 FE 530. Watershed Processes (4)
 GEO 530. Geochemistry (4)
 GEO 531. Applied Climatology (3)
 GEO 532. Applied Geomorphology (3)
 GEO 539. Topics in Physical Geography: Snow Hydrology (3)
 GEO 548. Field Research in Geomorphology and Landscape Ecology (3)
 GEO 582. Geomorphology of Forests and Streams (3)

Policy and Management**Select 15 credits from below:**

- ANTH 576. Community Impact Anthropology (3)
 ANTH 577. Cultural Ecology (3)
 ANTH 585. Uses of Anthropology (3)
 ANTH 591. Ethnographic Methods (4)
 AEC 523. Statistics and Optimization for Economics (4)
 AREC 505. Reading and Conference: Resource Economics (3)
 or AREC 507. Seminar: Resource Economics (3)
 AREC 512. Microeconomic Theory I (4)
 AREC 525. Econometric Methods (4)
 AREC 534. Environmental and Resource Economics (3)
 AREC 543. International Trade (4)
 AREC 550. Environmental Economics (3)
 AREC 551. Applications of Environmental and Natural Resource Economics (4)
 COMM 540. Theories of Conflict and Conflict Management (3)
 COMM 546. Communication in International Conflict and Disputes (3)
 FOR 562. Natural Resource Policy and Law Interactions (3)
 FOR 563. Environmental Policy and Law Interactions (3)
 GEO 520. Geography of Resource Use (3)
 GEO 524. International Water Resources Management (3)
 GEO 525. Water Resource Management in the U.S. (3)
 GEO 529. Topics in Resource Geography: Water Resources Management (3)
 GEO 532. Applied Geomorphology (3)
 MRM 515. Coastal Resources Management (4)

- PS 571. Public Policy Theory (4)
 PS 572. Public Administration (4)
 PS 575. Environmental Politics and Policy (4)
 PS 576. Science and Politics (4)
 PS 577. International Environmental Politics and Policy (4)
 SOC 556. Science and Technology in Social Context (4)
 SOC 581. Society and Natural Resources (4)
 SOC 585. Consensus and Natural Resources (3) (Also offered as ANS, FW)

WATER RESOURCES SCIENCE (MS, PhD)**Graduate Areas of Concentration**
*Water resources science***Core Courses (6 credits)**

- WRP/WRS 507. Seminar: Water Resources (1)
 WRP/WRE/WRS 505. Reading and Conference: Water Resources Journal Club (1)
 WRP/WRE/WRS 507. Seminar: Water Resources Seminar and Journal Club (1)
 WRP 524. Socio-technological Aspects of Water Resources (3)

Water Resources Science Courses
Select 12 credits for the MS or 15 credits for the PhD from below:

- ATS 520. Principles of Atmospheric Science (4)
 ATS 564. Interaction of Vegetation and Atmosphere (3)
 BEE 512. Physical Hydrology (3)
 BEE 525. Stochastic Hydrology (3)
 BEE 533. Drainage (Irrigation) System Design (4)
 BEE 542. Vadose Zone Transport (4)
 BEE 544. Open Channel Hydraulics (4)
 BEE 546. River Engineering (4)
 BEE 548. Nonpoint Source Pollution Assessment and Control (3)
 BEE 549. Regional Hydrologic Modeling (3)
 CE 517. Hydraulic Engineering Design (4)
 CE 518. Groundwater Modeling (4)
 CE 543. Applied Hydrology (4)
 CE 548. Water Quality Dynamics (3)
 CSS/SOIL 523. Principles of Stable Isotopes (3)
 CSS/SOIL 535. Physics of Soil Ecosystems (3)
 CSS/SOIL 536. Vadose Zone Hydrology Lab (1)
 CSS/SOIL 545. Geochemistry of Soil Ecosystems (4)
 CSS/SOIL 555. Biology of Soil Ecosystems (4)
 ENVE 521. Water and Wastewater Characterization (4)
 ENVE 554. Groundwater Remediation (4)
 FE 530. Watershed Processes (4)
 FE 532. Forest Hydrology (4)
 FE 537. Hillslope Hydrology (4)
 FS 561. Physiology of Woody Plants (3)
 FW 556. Limnology (5)
 FW 579. Wetlands and Riparian Ecology (3)
 FW 580. Stream Ecology (3)
 GEO 530. Geochemistry (4)
 GEO 531. Applied Climatology (3)
 GEO 532. Applied Geomorphology (3)
 GEO 539. Topics in Physical Geography: Snow Hydrology (3)
 GEO 544. Remote Sensing (3)
 GEO 548. Advanced Field Research in

- Geomorphology and Landscape Ecology (3)
 GEO 582. Geomorphology of Forests and Streams (3)
 GEO 589. Role of Fluids in Geologic Processes (3)
 GEO 691. Mass and Heat Transport in the Environment (4)
 GPH 665. Geophysical Field Techniques (3)
 MB 548. Microbial Ecology (3)
 OC 670. Geophysical Fluid Dynamics (4)
 RNG 555. Riparian Ecology and Management (3)

Total=18–21**GRADUATE MINORS:****WATER RESOURCES GRADUATE MINOR****Graduate Areas of Concentration***Hydrology, water quality, water resources planning and management*

A Water Resources graduate minor for master of science, master of arts, and doctor of philosophy degree programs is offered with specialization in hydrology, water quality, or water resources planning and management. The first two options are technically oriented, while the third gives added socioeconomic emphasis. Seminars, readings, and conferences are offered by Water Resources Graduate Program.

The graduate minor options are structured around core groups of courses and complementary courses designed to broaden the student's education. University departments and schools that offer courses related to water resources include the departments of Applied Economics; Anthropology; Biochemistry and Biophysics; Biological and Ecological Engineering; Botany and Plant Pathology; Business Administration; Chemistry; Crop and Soil Science; Entomology; Fisheries and Wildlife; Forest Engineering; Forest Resources; Mathematics; Microbiology; Public Health; Rangeland Ecology and Management; Statistics; and Zoology; the School of Chemical, Biological, and Environmental Engineering; the School of Civil and Construction Engineering; the School of Mechanical, Industrial, and Mechanical Engineering; School of Public Policy; and the College of Earth, Ocean, and Atmospheric Sciences. About 20 departments conduct teaching or research programs in water resources.

For more information, contact gradwater_director@oregonstate.edu or visit <http://oregonstate.edu/gradwater/>.

WATER RESOURCES ENGINEERING GRADUATE MINOR**Graduate Areas of Concentration***Groundwater engineering, surface water engineering, watershed engineering*

A graduate minor in Water Resources Engineering for master of science, master

of arts, and doctor of philosophy degree programs is offered with specialization in groundwater engineering, surface water engineering, or watershed engineering. Seminars, courses, and reading and conference courses in water resources engineering are offered by Water Resources Graduate Program.

The graduate minor options are structured around courses designed to broaden the student's education in one of the above areas of concentration. University departments and schools that offer courses related to water resources engineering include the departments of Biochemistry and Biophysics; Biological and Ecological Engineering; Botany and Plant Pathology; Chemistry; Crop and Soil Science; Geosciences; Mathematics; Rangeland Ecology and Management; Statistics; the School of Forest Engineering, Resources and Management; the School of Biological and Population Health Sciences; the School of Chemical, Biological, and Environmental Engineering; the School of Civil and Construction Engineering; the School of Mechanical, Industrial, and Mechanical Engineering; and the College of Earth, Ocean, and Atmospheric Sciences. About 20 departments conduct teaching or research programs in water resources.

For more information, contact gradwater_director@oregonstate.edu or visit <http://oregonstate.edu/gradwater/>.

WATER RESOURCES POLICY AND MANAGEMENT GRADUATE MINOR

Graduate Areas of Concentration *Water resources policy and management*

A graduate minor in Water Resources Policy and Management for master of science, master of arts, and doctor of philosophy degree programs is offered with specialization in the human dimensions of water resources policy and management. Seminars, readings, and conferences in water resources policy and management are offered by Water Resources Graduate Program and several affiliated departments.

The graduate minor options are structured around courses designed to broaden the student's education in water resources policy and management. University departments that offer courses related to water resources policy and management include the departments of Applied Economics; Anthropology; Fisheries and Wildlife; Geosciences; Rangeland Ecology and Management; Statistics; and Zoology; the School of Public Policy; the School of Forest Engineering, Resources and Management; the School of Biological and Population Health Sciences; the College of Business Administration, and the College of Earth, Ocean, and Atmospheric Sciences.

For more information, contact gradwater_director@oregonstate.edu or visit <http://oregonstate.edu/gradwater/>.

WATER RESOURCES SCIENCE GRADUATE MINOR

Graduate Areas of Concentration *Water resources science*

A graduate minor in Water Resources Science for master of science, master of arts, and doctor of philosophy degree programs is offered with specialization in hydrology or geochemistry. Seminars, readings, and conferences are offered by Water Resources Graduate Program.

The graduate minor options are structured around courses designed to broaden the student's education in water resources science, specifically in hydrology or geochemistry. University departments and schools that offer courses related to water resources science include the departments of Biochemistry and Biophysics; Biological and Ecological Engineering; Botany and Plant Pathology; Chemistry; Crop and Soil Science; Entomology; Fisheries and Wildlife; Geosciences; Mathematics; Microbiology; Rangeland Ecology and Management; Statistics; and Zoology; and the School of Forest Engineering, Resources and Management; the School of Biological and Population Health Sciences; the School of Chemical, Biological, and Environmental Engineering; the School of Civil and Construction Engineering; the School of Mechanical, Industrial, and Mechanical Engineering; the School of Public Policy; and the College of Earth, Ocean, and Atmospheric Sciences. About 20 departments conduct teaching or research programs in water resources.

For more information, contact gradwater_director@oregonstate.edu or visit <http://oregonstate.edu/gradwater/>.

WATER RESOURCES ENGINEERING COURSES

WRE 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

WRE 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

WRE 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

WRE 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

WRE 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

WRE 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

WRE 510. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits.

WRE 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

WRE 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

WRE 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

WRE 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

WRE 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

WRE 608. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

WRE 610. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits.

WRE 699. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

WATER RESOURCES POLICY AND MANAGEMENT COURSES

WRP 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

WRP 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

WRP 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

WRP 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

WRP 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

WRP 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

WRP 509. PRACTICUM (1-16). This non-traditional class explores tools, models and concepts in the collaborative decision-making process in water resources. Emphasis is on group projects and self-directed practical application of community-based natural resources. This course is repeatable for a maximum of 16 credits.

WRP 510. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits.

WRP 521. WATER CONFLICT MANAGEMENT AND TRANSFORMATION (3). Examines ways to work effectively in contentious water situations. Explores conflict tolerance, prevention, management, and transformation through collaborative structures as well as through models of negotiation and dialogue.

WRP 523. ENVIRONMENTAL WATER TRANSACTIONS (3). Covers the theory and practice of using water rights transactions to reallocate water rights to environmental purposes. Different transactional techniques and contexts appropriate to their use are presented through case studies primarily from the western United States, with some reference to the use transactions in other countries such as Australia. **PREREQS:** Graduate standing.

WRP 524. SOCIOTECHNOLOGICAL ASPECTS OF WATER RESOURCES (3). Core curriculum, graduate-level course in the Water Resources Graduate Program focusing on an interdisciplinary approach to water resources research that integrates the human and the technological dimensions of water resource issues. It is comprised of lecture and discussion sessions with guest lectures by visiting seminar speakers. **PREREQS:** Graduate student standing.

WRP 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

WRP 808. WORKSHOP (1-4). This course is repeatable for a maximum of 4 credits.

WATER RESOURCES SCIENCE COURSES

WRS 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

WRS 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

WRS 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

WRS 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

WRS 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

WRS 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

WRS 510. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits.

WRS 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

WRS 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

WRS 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

WRS 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

WRS 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

WRS 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

WRS 608. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

WRS 610. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits.

WRS 699. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

OTHER PROGRAMS WITHIN THE GRADUATE SCHOOL

COLLEGE AND UNIVERSITY TEACHING GRADUATE CERTIFICATE

The 18-credit graduate certificate in College and University Teaching is designed to provide advanced course work and experiential learning opportunities to current graduate students who plan to pursue careers in teaching and instruction in higher education settings or who plan to pursue careers that require similar skill sets in facilitation.

Core courses focus on educational/learning theory and instructional strategies for working with adult learners. The specialized course work includes student-selected course work, workshops, and/or other approved experiences appropriate to the student's field of study. The supervised teaching internship will allow students to engage in supervised field experiences to practice and refine instructional skills. The capstone teaching portfolio will provide a culminating professional development experience for students.

For further information, contact the Graduate School, A300 Kerr Administration Building, 541-737-4881; FAX 541-737-3313, Website: http://oregonstate.edu/dept/grad_school/.

The general structure of the certificate is:

- Core course work (8 credits)
- Specialized course work and experiences (4 credits)
- Supervised teaching internship (3 credits)

- Capstone teaching portfolio (3 credits)

COURSES

GRAD 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits.

GRAD 420. GRADUATE SCHOOL PREPARATION (1). Applying for graduate or professional school can be a daunting task. How and where to apply, how to choose an advisor, what to look for in a school, and how to obtain funding are hurdles to overcome during the application process. Supplemental materials will be provided as part of the course materials.

GRAD 430. INTRODUCTION TO SCIENTIFIC DIVING (4). Incorporates academic, confined water and open water training to prepare the student to manage the task loading associated with performing scientific tasks underwater. Introduces the diver to basic techniques and equipment used in underwater data collection. Qualifies the student for acceptance into the OSU Scientific Diving Program as a Scientific Diver-in-Training, at the discretion of the DSO and OSU Diving Control Board. Includes field trips. **PREREQS:** Minimum Course Prerequisites - Submission of an AAUS/OSU Scientific Diving Application and Diving Medical History to the OSU DSO - Submission of an AAUS/OSU Medical Evaluation of Fitness for Scuba Diving to the OSU DSO showing no contraindications for diving - Ability to complete the OSU scientific diver swim evaluation - Advanced Open Water certification from a recognized training agency (Rescue Diver strongly preferred). Experience in lieu of training may be recognized by the DSO - Current certifications in CPR, First Aid, AED, and Emergency Oxygen Administration - Proof of diving accident insurance (Divers Alert Network or equivalent) - Student must provide basic snorkeling gear, exposure protection, suitable cutting tool, light, slate, and underwater timing device

GRAD 499. SPECIAL TOPICS (4). Graduate school preparation. **PREREQS:** Junior or senior standing, preferably with GPA greater than 3.0.

GRAD 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits.

GRAD 511. DESIGNING A PATH FOR SUCCESS (1). Graduate student learners will be oriented onto paths that will help lead them toward degree completion and success. Students will receive foundational knowledge about graduate school requirements, effective mentor/mentee relationships, financing their education, research integrity and professional conduct, innovation and commercialization, and other soft skills essential for their progress through their graduate program. **PREREQS:** Graduate student standing only.

GRAD 520. RESPONSIBLE CONDUCT OF RESEARCH (1). Covers 10 topics in responsible conduct of research: ethical decision making; human subjects; animal welfare; data acquisition; sharing and ownership; research misconduct; conflicts of interest; authorship; peer review; mentor/trainee responsibilities; and collaborative science. Useful to all students who conduct scholarly activity. Graded P/N. **PREREQS:** Graduate standing.

GRAD 521. RESEARCH DATA MANAGEMENT (2). Careful examination of all aspects of research data management best practices. Designed to prepare students to exceed funder mandates for performance in data planning, documentation, preservation and sharing in an increasingly complex digital research environment. Open to students of all disciplines.

GRAD 530. INTRODUCTION TO SCIENTIFIC DIVING (4). Incorporates academic, confined water and open water training to prepare the student to manage the task loading associated with performing scientific tasks underwater. Introduces the diver to basic techniques and

equipment used in underwater data collection. Qualifies the student for acceptance into the OSU Scientific Diving Program as a Scientific Diver-in-Training, at the discretion of the DSO and OSU Diving Control Board. Includes field trips. **PREREQS:** Minimum Course Prerequisites - Submission of an AAUS/OSU Scientific Diving Application and Diving Medical History to the OSU DSO - Submission of an AAUS/OSU Medical Evaluation of Fitness for Scuba Diving to the OSU DSO showing no contraindications for diving - Ability to complete the OSU scientific diver swim evaluation - Advanced Open Water certification from a recognized training agency (Rescue Diver strongly preferred). Experience in lieu of training may be recognized by the DSO - Current certifications in CPR, First Aid, AED, and Emergency Oxygen Administration - Proof of diving accident insurance (Divers Alert Network or equivalent) - Student must provide basic snorkeling gear, exposure protection, suitable cutting tool, light, slate, and underwater timing device

GRAD 540. INTERVENING THE ISMS: DIVERSITY AWARENESS (3). Students will be afforded an opportunity to explore the ISMS within individual, societal, cultural and institutional contexts. Students will examine, document and analyze the influence of ISMS in their own lives--in their personal, community, social and professional relationships.

GRAD 550. INTRODUCTION TO ONLINE COURSE DEVELOPMENT AND FACILITATION (2). Prepares students to develop and teach distance courses. Students explore practical aspects of course development and facilitation: a brief history of distance education and pedagogical theory; course design principles; engagement of adult learners; active learning; and investigation of how online instruction, in addition to offering flexibility and convenience, also offers distinct pedagogical benefits. Open to students in all disciplines. **PREREQS:** Graduate standing.

GRAD 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 99 credits.

GRAD 607. CAPSTONE SEMINAR (3). Provides a culminating experience required for all graduate students pursuing the Graduate Certificate in College and University Teaching and for other graduate students seeking a structured opportunity to develop their teaching portfolio. **PREREQS:** AHE 547 and AHE 553

GRAD 610. INTERNSHIP (3). Provides a framework for the in-depth internship experiences required of all graduate students pursuing the Graduate Certificate in College and University Teaching and for other graduate students seeking a structured opportunity to reflect on and improve their teaching. Graded P/N. **PREREQS:** AHE 547* and AHE 553*

In an increasingly complex world, solutions to issues of emerging societal importance often require crossing traditional boundaries. Recognizing that students will need information from many available sources, Oregon State University offers a variety of undergraduate and graduate opportunities for interdisciplinary exploration and enrichment.

Interdisciplinary programs depend fundamentally upon the existence of strong disciplinary programs and place signifi-

cant responsibility upon students to integrate and synthesize information.

Because there are so many choices of subjects and so many ways to approach a given interest, it is crucial that students obtain guidance in order to understand the advantages and the limitations of particular disciplinary and interdisciplinary alternatives. Students are encouraged to contact the individuals identified at the beginning of each certificate, department, and degree listing for more information and advice.

UNDERGRADUATE PROGRAMS	LOCATION IN CATALOG/ADMINISTRATIVE UNIT
American Studies Major	College of Liberal Arts (OSU Cascades Campus only)
Applied Ethics Certificate	College of Liberal Arts, School of History, Philosophy, and Religion
Bioenergy Minor	College of Agricultural Sciences
Bioresource Research Major	College of Agricultural Sciences
Environmental Sciences Major	College of Earth, Ocean, and Atmospheric Sciences
Forest Engineering - Civil Engineering Major	College of Forestry, Dept. of Forest Engineering, Resources and Management
Gerontology Certificate	College of Public Health and Human Sciences, School of Social and Behavioral Health Sciences
International Studies Major	All colleges with undergraduate programs offer this major administered through International Programs.
Latin American Affairs Certificate	College of Liberal Arts, School of Language, Culture, and Society
Liberal Studies Major	College of Liberal Arts, Dept. of Liberal Studies
Multimedia Minors	College of Liberal Arts, School of Arts and Communication
Medical Humanities Certificate	College of Liberal Arts, School of History, Philosophy, and Religion
Natural Resource and Environmental Law and Policy Minor	College of Agricultural Sciences, Dept. of Agricultural and Resource Economics
Natural Resources Major and Minor	College of Forestry, Dept. of Forest Ecosystems and Society
Peace Studies Certificate	College of Liberal Arts, School of History, Philosophy, and Religion
Religion and Culture Certificate	College of Liberal Arts, School of History, Philosophy, and Religion
Russian Studies Certificate [Suspended]	College of Liberal Arts, School of Language, Culture, and Society
Sustainability Major	All colleges with undergraduate programs offer this major administered through College of Forestry, Dept. of Forest Ecosystems and Society.
Twentieth Century Studies Certificate [Suspended]	College of Liberal Arts
Women, Gender, and Sexuality Studies Minor and Certificate	College of Liberal Arts, School of Language, Culture, and Society
GRADUATE PROGRAMS	LOCATION IN CATALOG/ADMINISTRATIVE UNIT
Comparative Health Sciences (MS, PhD)	Graduate School
Environmental Sciences (MA, MS, PhD, PSM)	Graduate School
Gerontology Minor	College of Public Health and Human Sciences, School of Social and Behavioral Health Sciences
Interdisciplinary Studies (MAIS)	Graduate School
Marine Resource Management (MA, MS)	College of Earth, Ocean, and Atmospheric Sciences
Master of Agriculture (MAG)	College of Agricultural Sciences, Dept. of Agricultural Education and General Agriculture
Materials Science (MS, PhD)	College of Engineering, School of Mechanical, Industrial, and Manufacturing Engineering
Molecular and Cellular Biology (MS, PhD)	Graduate School
Natural Resources (MNR)	College of Forestry, Dept. of Forest Ecosystems and Society
Public Policy (MPP, PhD)	College of Liberal Arts, School of Public Policy
Toxicology (MAG, MS, PhD)	College of Agricultural Sciences, Dept. of Environmental and Molecular Toxicology
Water Resources Graduate Program Majors (MS, PhD) and Minors	Graduate School

The Division of International Programs plays a leadership and collaborative role in the university's comprehensive internationalization strategy by advancing international education for U.S. and international students, scholars and faculty; furthering the integration of global learning in OSU's teaching, research and outreach; and promoting OSU as a premier international research university through partnerships and regional initiatives. The division is led by the associate provost for International Programs, and includes the Offices of International Student Advising and Services (ISAS), International Degree and Education Abroad (IDEA), and International Scholar and Faculty Services (ISFS).

The division works collaboratively with INTO Oregon State University, the university center that offers a range of English language programs including preparatory programs for international students aiming to enter OSU at both graduate and undergraduate levels via pathway programs, rather than via direct admission. As part of this collaboration, the associate provost has oversight responsibilities for INTO OSU Academic Programs and International Admissions.

In addition, OSU also houses the Oregon University System International Programs and International Internships, which support all of Oregon's public institutions.

INTERNATIONAL DEGREE AND EDUCATION ABROAD (IDEA)

Laurie Lewis, *Senior Director of Operations and Strategic Initiatives*
University Plaza
1600 SW Western Blvd., Suite 130
Oregon State University
Corvallis, Oregon 97331
541-737-3006
Website: <http://oregonstate.edu/international/studyabroad/>

International Degree and Education Abroad (IDEA) is responsible for administering OSU education abroad programs and the International Degree program.

OVERSEAS STUDY AND EXCHANGE PROGRAMS

OSU students may broaden their education by taking part in education abroad programs. All of the programs allow qualified students from a wide variety of disciplines to earn academic credit from Oregon State University while pursuing their studies abroad. Not only do students earn OSU credit, but they can also apply their financial aid to help cover the costs.

More information about education abroad programs can be obtained in International Degree and Education Abroad (IDEA), Heckart Lodge, 541-737-3006.

Study Abroad Scholarships

International Degree and Education Abroad (IDEA) offers support with scholarships for study abroad including coaching for Gilman, Fulbright and Boren scholarships and fellowships.

INTERNATIONAL SCHOLAR AND FACULTY SERVICES (ISFS)

Charlotte Ross, *Director, International Scholar and Faculty Services (ISFS)*
University Plaza
1600 SW Western Blvd., Suite 190
Oregon State University
Corvallis, Oregon 97331
charlotte.ross@oregonstate.edu
541-737-3006
Fax: 541-737-6482
Website: <http://oregonstate.edu/international/atosu/scholars>

International Scholar and Faculty Services (ISFS) assists departments, units and colleges by advising on immigration regulations and visa options for visiting scholars and international hires. ISFS prepares and files the petitions and applications with the United States Citizenship and Immigration Services (USCIS), the Department of Labor (DOL), Department of State and other government agencies. ISFS represents OSU in working with USCIS and other government agencies, and ensures that the university complies with laws and regulations in processing employment-based visa petitions. ISFS represents OSU in working with the Department of State and the Department of Homeland Security in the administration of the J-1 Exchange Visitor Program through which we host visiting scholars, professors, interns, and exchange students. ISFS serves as a resource to the campus community by providing immigration-related advice on university-wide issues.

INTERNATIONAL STUDENT ADVISING AND SERVICES (ISAS)

Rachel Weber, *Interim Director, International Student Advising and Services (ISAS)*
University Plaza
1600 SW Western Blvd., Suite 130
Oregon State University
Corvallis, Oregon 97331
rachel.weber@oregonstate.edu
541-737-6310
Fax: 541-737-6226
Website: <http://oregonstate.edu/international/atosu/students>

International Student Advising and Services (ISAS) provides a variety of services to international students, including advising on immigration issues, financial and academic concerns, cultural adjustment, and personal issues. The unit is responsible for maintaining regulatory compliance and integrity of OSU's F-1 and J-1 student programs. Staff serves as a liaison and resource to OSU colleges

and departments, community groups, and US and foreign government agencies and sponsors to promote the interests of the OSU international student population. The unit maintains strong ties with international sponsoring agencies which provide a large and diverse population of students from traditionally under-represented countries. Staff provides outreach and conducts trainings and workshops for OSU faculty, staff and students on regulatory issues, employment, and cross-cultural competency. ISAS collaborates with INTO OSU to offer quarterly orientation programs for incoming students to help provide successful transition to the US/OSU educational system. Staff also works closely with INTO OSU to streamline services and programs to better serve all international students at Oregon State University. At present, there are approximately 3,000 international students from over 90 countries studying in degree-seeking, exchange, English language, and academic preparation programs at Oregon State University.

INTERNATIONAL DEGREE

Laurie Lewis, Senior Director of Operations and Strategic Initiatives

Nicholas Fleury, Head Advisor, International Degree

nicholas.fleury@oregonstate.edu
International Degree and Education
Abroad
University Plaza
1600 SW Western Blvd., Suite 130
Oregon State University
Corvallis, Oregon 97331
541-737-3006
Website: <http://oregonstate.edu/international/degree>

Undergraduate Major International Studies (BA, HBA)

The International Degree is Oregon State University's unique double degree program. It allows any interested undergraduate student the opportunity to explore the international dimensions of any primary major. International Degree students complete Advanced Proficiency in a Second Language, Four additional Baccalaureate Core Courses in International Studies, an International Experience, and a Senior Thesis.

As an International Degree participant, you will earn two degrees. The first degree, the primary degree, will be your chosen major in any department on campus. The International Degree, or concurrent degree, will be in International Studies in your primary degree department.

For example, if your primary degree is a BS in Environmental Sciences, then the

International Degree would be a BA in International Studies in Environmental Sciences.

ADMISSION REQUIREMENTS TO THE INTERNATIONAL DEGREE PROGRAM

1. A minimum 2.75 cumulative GPA after completing at least 32 credits of college-level courses and good standing within your department, college and the university. The dean of your college may give you special consideration if you fall below this minimum. See the International Degree office for more information about this process.
2. Proficiency in a foreign language equivalent to that attained by the end of a second-year language sequence at OSU*. This may be met in one of the following ways:
 - a. Successful completion of four or more years of consecutive study of the same foreign language at the high school level preceding admission to Oregon State University;
 - b. Completion of the AP College Board test in a foreign language with a score of 4 or 5;
 - c. Completion of the third term of a second-year foreign language sequence at OSU or another accredited university with a GPA of 3.0 or better. This course must constitute a minimum of 4 quarter or 3 semester credits.
 - d. Completion of one term of a third-year foreign language course (i.e., any course designated 311, 312 or 313) at OSU or another accredited university with a GPA of 3.0 or better. This course must constitute a minimum of 3 quarter or 2 semester credits.
 - e. An international student whose native language is not English who wishes to use English to satisfy the foreign language entrance requirement will have satisfied the requirement upon admission to OSU.
3. Meet any additional requirements established by your major department or college.

SPECIAL NOTES ABOUT ADMISSION

If you change majors after admission to the International Degree Program, you will have to reapply for admission to the International Degree Program in your new department.

If you are pursuing two degrees besides the International Degree, you only need to apply for the International Degree in one department. The choice of depart-

ments is up to you, but you should consult your advisors before determining where to apply.

*You may be admitted to the program as a pre-International Degree student if you meet all the requirements listed above except for the two-year language requirement.

GENERAL INTERNATIONAL DEGREE REQUIREMENTS

1. You must successfully complete all departmental, college, and institutional requirements for your primary degree.
2. You must also complete a minimum of 32 credits in residence beyond the minimum 180 to 204 credits required for most primary degrees. Courses taken through an OSU-sponsored program abroad are considered in-residence credits. Depending on the level of previous foreign language study and experience abroad, you could take anywhere from a minimum of 32 additional credits to a maximum range of 70-plus additional credits to complete the degree.
3. Additional International Degree requirements may be established for your primary degree, so check with your major advisor or the International Degree contact in your department to make sure that you know what they are and that you are able to complete them. When you meet with your advisor, have a transcript in hand.
4. As is currently true for all degrees, your academic dean will verify that you have completed the International Degree requirements. The graduation audit will be done along with and in the same fashion as for your primary degree by your major department. Confirmation of the International Degree will be appropriately noted on your transcripts, and you will receive separate diplomas.

SPECIFIC INTERNATIONAL DEGREE REQUIREMENTS

1. You must demonstrate advanced level achievement or proficiency in a foreign language in one of the approved ways. Typically, this requirement is met by completing the third term of a fourth-year language sequence at OSU. Students must take language courses for letter grades and earn a cumulative GPA of 3.0. Exceptions may be considered only by petition (see International Degree office for details). To find out about additional ways to demonstrate advanced proficiency, contact the International Degree office.
2. You must successfully complete a

minimum of four courses selected from the baccalaureate core curriculum, with the approval of your departmental International Degree advisor. These courses are in addition to the university's baccalaureate core requirements. The International Degree course requirements from the baccalaureate core are as follows:

- One course selected from the Western Culture category (3–4 credits);
 - Two courses selected from the Cultural Diversity category (6–8 credits);
 - One course selected from the Western Culture, Cultural Diversity, or Contemporary Global issues categories (3–4 credits). **Note:** Not all four courses may focus on the same culture or language. For example, you cannot take all four of the additional baccalaureate core courses focusing on Spanish speaking countries/peoples.
 - To see the entire baccalaureate core list go to <http://catalog.oregonstate.edu/BCC.aspx>.
3. The third requirement of the degree is to spend a minimum of 10 weeks in a country where your International Degree language is spoken and be engaged in a study abroad program, an international internship or an international research project.
 4. The final requirement for the degree is to prepare a rigorous and integrative senior thesis, which demonstrates a fundamental and comprehensive understanding of global issues and of the international dimensions of your primary degree. Requirements for the senior thesis include successful completion of INTL 407, Seminar: International Issues: Introduction to Thesis for 1 credit, and 3 to 6 credits of 403 (Thesis) in your department.

GRADUATION LANGUAGE REQUIREMENTS

Students must demonstrate advanced level achievement or proficiency in a single foreign language in one of the following ways:

- Completion of a fourth-year foreign language sequence (designated 411, 412, 413) at OSU with a minimum 3.00 GPA cumulative in all foreign language courses. Courses must be taken for a letter grade and may not be graded S/U.
- Completion of a fourth-year foreign language sequence at another accredited university with a minimum 3.00 GPA, in a program in which the combined third-year

and fourth-year language courses constitute a minimum of 18 quarter or 12 semester credits.

- Completion of a minimum of 9 quarter (6 semester) credits with a minimum 3.00 GPA, at Oregon State University or another accredited university, of any 400-level course work (in any discipline) taught in a foreign language, if approved by the student's primary degree department or school.
- Demonstration of end of fourth-year level proficiency in a foreign language by successful completion of an achievement test administered by the School of Language, Culture, and Society at OSU.
- Demonstration of fourth-year level proficiency in a foreign language as evidenced by an oral proficiency test administered by a certified foreign language proficiency tester that is approved by the OSU School of Language, Culture, and Society.
- For languages not offered at OSU, the requirement may also be completed by a minimum of nine-month residency (study, research, work), after fulfilling the foreign language entrance requirement, in a country in which the language is spoken.
- Completion of a minimum of one term international internship using the target language after completion of a third-year language sequence (311, 312, 313) at OSU with a cumulative GPA of 3.0 or above.

EXPERIENCE ABROAD

Students must spend a minimum of 10 weeks in another country where the language used to meet the International Degree requirement is spoken and be engaged in one of the following:

- A study abroad program offered by OSU, another university, or a program designed by the student. Programs administered by other universities or those designed by students must be approved by the International Degree Program and the student's primary department. Currently OSU has university-sponsored programs in over 70 countries.
- An international internship or work program that receives academic credit, such as the IE₃ Global Internship Program offered by OSU.
- A pre-approved research project abroad.
- Previous international experience, such as the Peace Corps, approved by the primary academic department and the International Degree Program.

SENIOR THESIS

The final requirement for the degree is to prepare a rigorous and integrative senior thesis that demonstrates a fundamental and comprehensive understanding of global issues and of the international dimensions of your primary degree. This thesis places your academic discipline in an international context, often in a comparative fashion. Because it fulfills the writing intensive course requirement for the International Degree, it will involve multiple drafts and revisions. The final product will represent polished, formal writing, in a format appropriate to your academic field.

Dual Thesis Requirements:

You may write one thesis to meet the International Degree requirement and the thesis requirement in your department. If you will complete a senior thesis to meet another academic requirement in your primary degree, it is important to consult with academic advisors in your major as well as in the International Degree office.

- **Example:** If you are in the University Honors College, you will work with both the Honors College and the International Degree office to ensure that you fulfill both sets of requirements.

Thesis proposal: A copy of the thesis proposal form will be on file in the International Degree Program office. The topic will evolve as you work, and may change substantially, but identifying an appropriate advisor and developing a proposal form are crucial steps in your progress toward completion of the thesis requirement of the International Degree. If your thesis ideas change significantly, it is important to file a revised proposal with the International Degree Program office.

Thesis credit: Before graduating, you will spend two to three terms working on the thesis and will receive credits through your major department. You will register for a minimum of 3 thesis credits under the department prefix appropriate to your major (403), with your thesis advisor as the professor of record. These credits may be distributed over multiple terms, and you may receive an incomplete for the credits taken during the earlier term(s) until you have finished your thesis work. You will register for these credits during the year you plan to complete your thesis work, as incomplete grades should be removed within 12 months. Please note that credits for which you receive an incomplete do not count toward credits satisfactorily completed during that term. If you receive financial aid, you should plan ahead to ensure that this does not affect your aid eligibility.

- **Example:** If you are a sociology major, you would register for a minimum

of 3 credits of SOC 403. If you are a mathematics major, you would register for MTH 403. Some departments already have a thesis course listed in the schedule of classes, but other departments may ask the registration schedule desk to set up a CRN for that course number during the term(s) for which you wish to register for thesis credit.

These credits may be graded or pass/no pass. If you and your advisor agree that the scope of your thesis warrants additional credit, and your college and department's policies allow it, you may register for additional credits. The suggested maximum is 6 credits.

Colleges, departments, or advisors may elect to set different requirements for thesis credits that meet the needs of their programs. In this case, the requirements or preferences of the college/department take precedence over general International Degree requirements.

Requirements for the Senior Thesis Include:

Thesis class: As a part of your program, you will enroll in the 1-credit class INTL 407, Seminar: International Issues: Introduction to Thesis, offered on a pass/no pass grading basis. The course is offered twice a year during fall and winter terms. It is designed to help you define and focus your areas of interest, get an overview of research methods, develop your thesis ideas, identify a suitable advisor in your major department who will assist you throughout the process, complete a thesis proposal form, and develop a realistic and effective timetable for completion. During this course, you will receive a copy of the guide, *Preparing a Senior Thesis*, and an advisor information sheet, which will help you and your advisor as you work on your thesis. **Note:** If you are also a student in the University Honors College, you may enroll in either the UHC thesis class or the International Degree Program's thesis class.

Final thesis: This represents polished, formal writing. Theses average 30 to 50 pages, but to ensure fulfillment of the WIC requirement, even a thesis with a nonverbal component such as art, music, or photography must include a minimum of 8 to 10 pages of formal writing and place the thesis in the appropriate historical/cultural context by incorporating and documenting outside sources.

• **Example:** A graphic arts student who interned in Russia compared contemporary posters in the U.S. and Russia, and displayed examples. He also wrote an analysis of his findings.

Presentation: When your thesis is complete, you will make a public presentation of your work. The format may vary depending on your topic and your own preferences, but you will present your thesis to a group including your advisor, other interested faculty in your department, representatives of the International Degree program, and other guests whom you may want to invite.

Final copies of the log and thesis must be turned in to your major department and the International Degree office two weeks prior to the date that grades are due for graduating seniors for the term you plan to graduate. This is usually a week before finals week.

ADDITIONAL COLLEGE AND DEPARTMENTAL REQUIREMENTS

Foreign Language Majors

To earn the International Degree you must complete the second foreign language required of a language major through the fourth-year level. You must also spend two 10-week periods abroad, one in each of the countries where the two languages you are studying are spoken. For example, if you are a German major and have decided to take Russian as your second foreign language, you must complete the 400-level Russian course and study abroad in both Germany and Russia.

Additionally, you may not complete major/minor requirements without taking upper-division courses in the OSU School of Language, Culture, and Society even if you complete the hour requirements abroad.

College of Forestry Majors

As part of the four additional baccalaureate core courses required for the International Degree, you must take FE/FOR 456, *International Forestry (3).

SCHOLARSHIPS

In support of the overseas learning experience, the International Degree Program has funds available to assist students traveling abroad and to assist with costs associated with research for your thesis. These are awarded on a competitive basis. Please talk to the International Degree office for more information.

OREGON UNIVERSITY SYSTEM INTERNATIONAL PROGRAMS AND IE₃ GLOBAL INTERNSHIPS

Krista Lane, *Interim Director*
OUS International Programs
1600 SW Western Blvd., Suite 290
Corvallis, Oregon 97333-4187
541-737-3006
krista.lane@ous.edu
Website: <http://oregonabroad.ous.edu/>

In addition to furthering the international agenda for OSU, International Programs helps to fulfill OSU's mission as a land grant university by providing structure and support to the Oregon University System's International Exchange Programs and IE₃ Global Internships. These programs, open to students from all Oregon university campuses, provide unique study and professional development opportunities through institutional relationships that promote academic and cultural understanding, economic opportunities, and professional experience in an international context. OUS International Programs and IE₃ Global Internships are housed at Oregon State University and offered in cooperation with each of Oregon's public universities. For more information, visit <http://oregonabroad.ous.edu>.

INTERNATIONAL INTERNSHIPS

IE₃ Global Internships, sponsored by the Oregon University System, enables OSU students in all majors to complete a full-time internship related to their career goals in an international setting. IE₃ interns gain professional work experience while developing cross-cultural skills and, in many cases, foreign language abilities relevant to their field of study.

Internships can vary in length, usually three to six months, and in type of organization, from nonprofit groups to business to government agencies. Placements are offered in health care, conservation biology, business, education, politics, social work, communications, engineering, agriculture, and forestry. Internships are available in Europe, Latin America, Africa, Oceania and Asia.

Excellent opportunities exist for students with strong foreign language skills in addition to the many English-speaking internships offered by the program. Juniors, seniors and master's level students are eligible to participate. Full position descriptions for each placement are available on the IE₃ Global Internships website: <http://ie3global.ous.edu/>.

COURSES

INTL 199 SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

INTL 299 SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

INTL 399 SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

INTL 405 PROJECTS: INTERNATIONAL PROJECTS (1-16). Projects of an international nature. This course is repeatable for a maximum of 16 credits. **PREREQS:** Must be arranged with instructor prior to registration.

INTL 406 SPECIAL PROGRAMS/SPECIAL TOPICS (1-16). Projects of an international nature. This course is repeatable for a maximum of 16 credits.

INTL 407 SEMINAR: INTERNATIONAL ISSUES (1-16). Advanced study of selected topics related to a variety of international issues. This course is repeatable for a maximum of 16 credits.

INTL 408 WORKSHOP (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

INTL 410 INTERNSHIP: INTERNATIONAL INTERNSHIPS AND SEMINAR (1-16). Internships and seminars for students working abroad or working on an international project. This course is repeatable for a maximum of 16 credits. **PREREQS:** Must be arranged with instructor prior to registration.

INTL 499 SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

INTL 599 SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

The College of Liberal Arts offers major programs in the arts, humanities, and social sciences that comprise the core of human knowledge. Students can earn degrees and minors in the college's many disciplines and interdisciplinary programs, as well as certificates of specialized training in seven other fields. Qualified students can also participate in a joint program with the College of Law at Willamette University, in which they can earn their bachelor's and law degrees in six years.

Success follows opportunity. In the College of Liberal Arts opportunities for academic success and enhanced professionalism are provided to all. Students gain the skills and knowledge required to integrate creative problem-solving with a sense of social responsibility and involvement in activities that enrich the cultural life of the university, Corvallis, the state of Oregon and the entire world.

Students in the College of Liberal Arts receive individual attention in student learning communities and have the opportunity to interact in small groups with their professors, many of whom are also their academic advisors. This more personal environment and interaction results in the possibility of going beyond surface knowledge to a deeper understanding of the discipline being studied and how it impacts human knowledge, commerce, art and science.

The qualifications and accomplishments of the faculty members in the College of Liberal Arts are truly impressive. A strong commitment to teaching by faculty of great personal achievement and learning ensures that students will receive an excellent education by enrolling in one of the majors offered in the College of Liberal Arts...where successful futures begin.

MAJORS

The College of Liberal Arts offers major programs leading to the bachelor of arts (BA) or bachelor of science (BS) degree in the following:

American Studies

(OSU-Cascades Campus only)

Anthropology

Options: Archaeology/Physical Anthropology, Biocultural Option, Cultural Anthropology, General Anthropology

Applied Visual Arts, BFA

Options: Fine Arts BFA, Photography BFA

Art

Options: Art History, Fine Arts, Photography

Digital Communication Arts

Economics

Options: Law, Economics and Policy; Managerial Economics; Mathematical Economics

English

Ethnic Studies

French

German

History

Liberal Studies

Option: Pre-Education

Music

Options: Instrumental Performance, Music Education, Music Production, Piano Performance, Vocal Performance

Philosophy

Political Science

Psychology

Sociology

Options: Crime and Justice, Environmental and Natural Resource Sociology

Social Science

(OSU-Cascades Campus only)

Option: Community Development and Leadership

Spanish

Speech Communication

Options: Communication, Theatre Arts

Women, Gender, and Sexuality Studies

Graduate Majors

Anthropology

Applied Ethics

Contemporary Hispanic Studies

English

History of Science

Public Policy

Women, Gender, and Sexuality Studies

Undergraduate Certificates

Applied Ethics

Language in Culture

Latin American Affairs

Medical Humanities

Peace Studies

Religion and Culture

Women, Gender, and Sexuality Studies

DOUBLE DEGREES IN EDUCATION OR INTERNATIONAL STUDIES OR SUSTAINABILITY

Undergraduates with majors in the College of Liberal Arts can earn a second degree in education or international studies or sustainability. See the College of Education or International Programs or Department of Forest Ecosystems and Society sections of this catalog for more information.

MINORS

Students throughout the university may elect to pursue the following undergraduate minors: Anthropology; Asian Studies; Communication; Economics; English; Ethnic Studies; French; German; History; Multimedia; Music; New Media Communications; Philosophy; Political Science; Psychology; Russian (*suspended*); Sociology; Spanish; Theatre Arts; Women, Gender, and Sexuality Studies; and Writing.

The College of Liberal Arts also offers many courses in the arts, humanities, and social sciences that are of value to all students and are basic to a liberal education. Such courses help students in their personal development and enrichment through a deeper understanding of themselves and appreciation of human cultural development.

TEACHER EDUCATION

The College of Liberal Arts offers excellent undergraduate preparation for elementary, middle or high school teach-

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Oregon State
University
Corvallis, OR
97331-6202
541-737-0561
Website: <http://liberalarts.oregonstate.edu>

ADMINISTRATION

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ers. The Liberal Studies pre-education program is ideal for elementary school teachers.

Students wanting to teach at the high school level may major in English, French, German, history/social studies, music or Spanish.

CERTIFICATE PROGRAMS

Certificate programs in Applied Ethics; Language in Culture; Latin American Affairs; Peace Studies; Religion and Culture; Russian Studies (*suspended*); and Women, Gender, and Sexuality Studies are offered to all students and may be taken concurrently with any major degree program.

PRE-LAW PREPARATION

OSU provides opportunities for a complete and rigorous preparation for students interested in attending law school. Our accomplished graduates attend some of the finest schools in the nation.

Law school is one of the few professional schools that do not require a particular set of courses as a prerequisite for admission. Students may major in any subject. Students should choose a major that engages and challenges them, a course of study where they can excel. They are advised to supplement their major courses with a diverse selection of classes that offer depth, rigor and skill in three areas: written and oral communication, deductive reasoning and logic, and a general knowledge of the institutions and values of our society.

The College of Liberal Arts offers many effective and engaging ways to prepare for law school, rather than one single pre-law program. Students interested in law school may contact Professor Rorie Solberg in the School of Public Policy. Call 541-737-2811 for her office hours. Students also may call the CLA Student Services Office, 541-737-0561. Students should also obtain the College of Liberal Arts pre-law advising brochure, which is available online at <http://liberalarts.oregonstate.edu/content/pre-law-program>.

ACCELERATED BA/BS AND LAW (JD) PROGRAM WITH WILLAMETTE UNIVERSITY COLLEGE OF LAW

This program enables OSU students to earn a BA or BS degree and a law degree in a total of six years, three years at OSU and three at Willamette University Law School.

Students may be admitted to the program anytime during their first two years of undergraduate study provided they have a 3.5 high school GPA and a minimum combined SAT score of 1950 or composite ACT score of 29. Students will complete all but 45 credits of upper-division electives for a BA or BS degree in defined majors¹ in the College of Liberal Arts. For admission to law school,

students must have earned a cumulative GPA of 3.4 or higher and a Law School Admission Test (LSAT) score no lower than the median LSAT for the prior year's entering class.

At Willamette University, the students' first-year law courses will satisfy the 45-credit upper-division elective requirements for their OSU degree. After completing the additional two years at Willamette, students will have completed both the Bachelor's and JD degrees in six years.

Note: OSU Honors College students are currently not eligible for this program due to the senior year thesis requirement.

Footnote:

¹ Anthropology; Economics; English; Ethnic Studies; French; German; History; Liberal Studies; Philosophy; Political Science; Sociology; Spanish, Speech Communication; Women, Gender, and Sexuality Studies.

ACADEMIC ADVISING

Mission Statement: The College of Liberal Arts academic advising is a teaching and learning process dedicated to student success. Academic advising engages students in developing a plan to realize their educational, career and life goals.

Values Statement: The values associated with advising in the College of Liberal Arts are closely aligned with the stated values of the university.

- **Accountability:** We are committed to providing timely, accurate and intentional advising.
- **Diversity:** We honor the unique nature and interests of each student. Advising services and delivery methods will be shaped to fit the diverse needs of our campus populations.
- **Respect:** We seek to establish a reciprocal relationship with students based on an ethic of care and shared responsibility.
- **Social Responsibility:** We foster a culture of independent thinking and global awareness so that students make informed, socially responsible choices consistent with their academic, career and life goals.
- **Integrity:** We seek to engage students in a fair and professional process of meaningful self-reflection and authentic inquiry.

COLLEGE OF LIBERAL ARTS REQUIREMENTS

A liberal arts education involves exploration and broad study beyond one's major field. Students are encouraged to understand other cultures, other ways of knowing, and other fields of study. Students are also encouraged to take more courses in areas outside their major field to enhance their experience.

Liberal arts students are required to satisfy four sets of requirements:

- Oregon State University Baccalaureate Core
- College of Liberal Arts Core
- BA or BS requirements
- Major program requirements

The university baccalaureate core course requirements are explained in a separate section, "Earning a Degree at Oregon State." The College of Liberal Arts Core and the BA and BS requirements are explained below. The major program requirements are explained in the appropriate section in the pages that follow. If you want to add a minor program, you will also need to complete the requirements for that minor. Specific requirements for interdisciplinary minors are listed in the Interdisciplinary Programs section of this catalog. Specific requirements for disciplinary minors are usually given in the appropriate school or departmental section; for example see the School of Public Policy section for requirements for the Economics minor.

You may not use a single course to satisfy more than one of these requirements. In addition, you may not use courses within your major field to satisfy either baccalaureate core or liberal arts core requirements. (However, courses taken to satisfy the baccalaureate core requirements or the liberal arts core may also be used to satisfy requirements for a minor.)

LIBERAL ARTS CORE

The liberal arts core consists of five courses (at least 15 credits) as follows:

- **Humanities (3):** Critical examination of influential traditions and ideas as defined by major scholarly works (includes English literature; ethnic studies; film studies; foreign language and literatures, including culture; history; and philosophy).
- **Fine Arts (3):** Participation in or appreciation of different forms (includes art, music, theater, and creative writing in poetry, fiction, or drama).
- **Social Science (3):** Scientific investigation and theory pertaining to human individuals, social groups, institutions, and ideologies (includes anthropology; economics; political science; psychology; sociology; women, gender, and sexuality studies; and selected geography courses).
- **Nonwestern Culture (3):** Study in any of the following areas focusing outside of Western culture—Africa, Asia, Russia, South America, Central America, Caribbean, Middle East, the Pacific, or Native North Americans.
- **One additional course** from one of the preceding four areas (3).

For a list of specific courses that satisfy the liberal arts core requirements, use the Schedule of Classes Searcher website and scroll down to the CLA Liberal Arts Core Courses search feature: <http://catalog.oregonstate.edu/SOCSearcher.aspx>.

BA/BS REQUIREMENTS

Nearly all liberal arts students graduate with either a bachelor of arts or bachelor of science degree.

- **BA Requirement:** Second-year proficiency in a second language, including ASL, at the college level with at least a C–.
- **BS Requirement:** A minimum 15-credit block of science, computer science, and quantitative studies as follows:
 1. Any computer science (CS) course approved by the student's major school or department (3–4), and
 2. Any course from the College of Science approved by the student's major school or department except math (MTH) or statistics (ST) courses (3–4), and
 3. One of the following (8–12):
 - ST 201 and ST 352 or ST 351 and ST 352 (8).
 - MTH 111 and MTH 245 (4,4).
 - Any 8 credits of MTH courses at the 200 level or above (not including MTH 211 and MTH 212).
 - MTH 211, MTH 212, or MTH 390 (4,4,4). Pre-elementary education majors only.
 - MTH 241, MTH 245 or MTH 251, and ST 351.

Many schools or departments require specific courses to satisfy the BS degree requirements; students should consult their academic advisors for details. Courses used to satisfy the BS degree requirements may not also be used to satisfy baccalaureate core requirements.

Bachelor of Fine Arts (BFA) degrees in Applied Visual Arts and in Digital Communication Arts are offered by the School of Arts and Communication. BFA degree requirements differ from those in other College of Liberal Arts programs. Students in the BFA degree program must complete the baccalaureate core and a minimum of 105 credits in art or digital communication arts.

AMERICAN STUDIES

Neil Browne, *Director*
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541-322-3129
Email: neil.browne@osucascades.edu
Website: <http://www.osucascades.edu/academics/american-studies>

Undergraduate Major

American Studies (BA, BS, HBA, HBS)
American Studies is only offered only on the OSU-Cascades Campus.

AMERICAN STUDIES (BA, BS, CRED, HBA, HBS)

Offered only on the OSU-Cascades Campus.

An interdisciplinary major that engages American culture in its historical, contemporary, and global contexts. Examines American culture through a variety of media including film, music, literature, history, politics, and art. Teaching faculty come from several different disciplines and students approach course objectives from many scholarly vantage points.

Lower Division (COCC) (20 credits)

Required Sequences:

ENG 253. Survey of American Literature: Colonial to 1900 (4)
ENG 254. Survey of American Literature: 1900 to Present (4)
HST 201, HST 202. History of the United States (4)

Choose 1 course from the following COCC courses:

ARH 207. Native American Art History (4)
HST 203. *History of the United States (4) (*OSU online*)
HST 204. History of the Civil War (4)
HST 207. History of the American West (4)
HST 218. Native American History (4)
HST 225. U.S. Women's History (4)
HST 242. History of the Pacific NW (4)
HST 258. Colonial Latin American History (4)
HST 259. Modern Latin American History (4)
HUM 212. Culture and Literature of the Americas (4)
HUM 230. Immigrant Experience American Literature (4)
HUM 240. Native American Literature and Culture (4)
HUM 256. Introduction to African-American Literature (4)
HUM 262. Popular Culture: The American Western (4)
PS 201. Introduction to U.S. Government and Politics (4)
PS 203. State/Local Government (3)
WS 101M. Introduction to Women's and Gender Studies (4)[*Not offered every year.*]
WS 102. Introduction to Women Studies: Humanities (4)[*Not offered every year.*]

COCC Course Catalog: <http://www.cocc.edu/Admissions/Catalog/>

Upper Division (32 credits)

Required:

AMS 311. Topics in American Studies (4)
AMS 350. *American Culture and the Vietnam Experience (4)
ENG/ART 386, ENG/ART 387, ENG/ART 388. A Cultural History of American Art and Literature: Part I, II, III (4,4,4)

Choose from the following list to complete 32 credits:

ART 462. Directions and Issues in Contemporary Art (3)
ART 465. Native American Art (3)
COMM 326. Intercultural Communication (3)
COMM 412. Topics in Speech Communication (3)
COMM 416. Ethnography of Communication (3)
COMM 427. Cultural Codes of Communication: *Native American Codes of Place* (3)
ENG 317. *The American Novel: Beginnings to Chopin (4)
ENG 318. *The American Novel: Modernist Period (4)
ENG 319. *The American Novel: Post-World War II (4)
ENG 360. *Native American Literature (4)
ENG 362. *American Women Writers (4)
ENG 470. ^Studies in Poetry (4)
ENG 482. Studies in American Literature, Culture, and the Environment (4)
ENG 485. ^Studies in American Literature (4)
HST 362. Women in United States History (4) (Ecampus)
HST 468. History of the American West (4) (Ecampus)
HST 469. History of the Pacific Northwest (4) (Ecampus)
HST 475. Civil War and Reconstruction (4) (Ecampus)
HST 477. The Progressive and New Deal Eras (4) (Ecampus)
HST 481. *Environmental History of the United States (4) (Ecampus)
PS 321, PS 322, PS 323. American Constitutional Law (4,4,4)
PS 363. *Gender and Race in American Political Thought (4)
PS 375. *The Civil Rights Movement and Policies (4)
PS 429. ^Topics in Judicial Politics (4)
Any changes to this curriculum must be approved by the director of American Studies.

Footnotes:

* Bacc Core Course
^ Writing Intensive Course (WIC)

COURSES

AMS 311. TOPICS IN AMERICAN STUDIES (4). Selected topics, changed annually, that investigate American ideas, regions, events, or periods. Fulfills the requirement for an integrated course in the major. May be repeated as topics vary. Open to nonmajors. This course is repeatable for a maximum of 99 credits.

AMS 350. *AMERICAN CULTURE AND THE VIETNAM EXPERIENCE (4). Examines through literature, film, and popular media the effects of the Vietnam War on American culture. Taught at OSU-Cascades only. (Bacc Core Course)
PREREQS: Sophomore standing.

AMS 405. READING AND CONFERENCE (1-16). Independent, individual studies supervised by the director, members of the American Studies Board, or assigned professors, as arranged by the student and the director. This course is repeatable for a maximum of 16 credits.

AMS 406. PROJECTS (1). Studies of American culture and society centered around topical events or cultural programs of current interest in American studies. This course is repeatable for a maximum of 99 credits.

AMS 407. ^SEMINAR (1-16). May be repeated for credit as topics vary. (Writing Intensive Course) **CROSSLISTED** as ENG 407/ENG 507. This course is repeatable for a maximum of 16 credits.

AMS 410. AMERICAN STUDIES INTERNSHIP (1-6). Supervised and evaluated work in a variety of professional fields to enhance students career preparation; arranged at the initiative of the student one semester in advance. This course is repeatable for a maximum of 16 credits.

AMS 507. SEMINAR (1-16). May be repeated for credit as topics vary. **CROSSLISTED** as ENG 407/ENG 507. This course is repeatable for a maximum of 16 credits.

LIBERAL STUDIES

Louie Bottaro, Head Advisor

213 Gilkey Hall

Oregon State University

Corvallis, OR 97331-6202

541-737-0561

Email: louie.bottaro@oregonstate.edu

Website: http://oregonstate.edu/cla/liberal_studies/

Undergraduate Major

Liberal Studies (BA, BS, HBA, HBS)

Option

Pre-Education

LIBERAL STUDIES (BA, BS, CRED, HBA, HBS)

A BA or BS degree in Liberal Studies is available for students whose academic and career interests suggest greater curricular breadth and flexibility than is available in other major programs.

Candidates for the Liberal Studies major must complete the following:

- Oregon State University Baccalaureate Core
- College of Liberal Arts Core requirements
- A program consisting of 45 or more credits that are thematic in nature and include at least 27 upper-division credits developed from the course offerings of two or more departments within the College of Liberal Arts. The plan of study and statement of justification must be approved in advance by the head advisor or designee.

- At least one Writing Intensive Course (WIC) with a grade of C or better.
- Maintain a 2.0 or better university GPA.
- Maintain a 2.3 or better major GPA.

The typical program is designed to meet the needs and interests of the particular student and is unique in content. In some cases, a prestructured program may provide a suitable match.

PRE-EDUCATION OPTION

The BA or BS degree in Liberal Studies may be used to prepare for a teacher licensure program.

Pre-Education Option Core (94–105) (This fulfills the baccalaureate core.)

Computer Science (4)

Contemporary Global Issues (3)

Cultural Diversity (3)

Difference, Power, and Discrimination (3)

Education (3)

HDFS 311. Infant and Child Development (4)

HDFS 313. Adolescent Development (4)

HHS 231. *Lifetime Fitness for Health (2)

HHS 241–HHS 248. *Lifetime Fitness:

(various activities) (1)

or any PAC course (1–2)

GEO 105. *Geography of the Non-Western World (3)

and GEO 106. *Geography of the Western World (3)

Literature (9)

MTH 211, MTH 212, MTH 390.

*Foundations of Elementary Mathematics (4,4,4)

PSY 201, PSY 202. *General Psychology (3,3)

Science (Bacc core plus two additional from approved list) (18–20)

Science, Technology and Society (3)

Spanish: strongly recommended

Speech, Writing I, II (9)

Select one of three U.S. history courses below for 4 credits:

HST 201. *History of the United States (4)

HST 202. *History of the United States (4)

HST 203. *History of the United States (4)

Plus 6 additional history credits (6)

College of Liberal Arts Core (12)

One Specialization (45)

Select one from six distinct interdisciplinary specializations listed below. Contact Tristen Shay at 541-737-0561 for detailed specifications.

Specializations (select one):

Behavioral Science

Fine Arts

Language Arts

Russian Language and Culture

Social Studies

Spanish Language and Latino(a) Studies

COURSES

LS 199. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 16 credits.

LS 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits.

LS 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

LS 405. READING AND CONFERENCE (1-3). This course is repeatable for a maximum of 16 credits.

LS 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

LS 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

LS 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

LS 409. PRACTICUM (1-3). This course is repeatable for a maximum of 16 credits.

LS 410. INTERNSHIP (1-12). Restricted to students enrolled in off-campus programs. Not available to students in residence on the Corvallis campus. Maximum of 12 credits. This course is repeatable for a maximum of 12 credits. **PREREQS:** Junior or senior standing, and 15 credits of OSU residence work completed.

LS 428. ^INTERSECTIONS (3). An examination of liberal arts disciplines and their interrelations with emphasis on critical thinking and library skills. Includes attention to uses of a liberal arts degree. (Writing Intensive Course) This course is repeatable for a maximum of 6 credits.

LS 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

SCHOOL OF ARTS AND COMMUNICATION

Yuji Hiratsuka, *Art Area Coordinator*
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George Caldwell, *Theatre Arts Area Coordinator*
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Corvallis, OR 97331
541-737-4627
Email: theatre@oregonstate.edu
Website: <http://oregonstate.edu/dept/theatre/>

FACULTY

Professors Bennett (Emeritus), Campbell, M. Carlson, Coolen (Emeritus), Goodnow, Green, Headrick, Hiratsuka, Jordon, McCabe, Moore, Sayre, Walker, Weinman (Emeritus), Zielke

Associate Professors Bowker (Emeritus), Brooke, Brudvig, Bull, Caldwell, Chesley (Emeritus), Dollar, George (Emeritus), Iltis, Loges, Mason, Peltomaki, Poppino, Porrovecchio, Rossi
Assistant Professors Bradshaw, Chapman, Faltesek, E. Gallagher, Hesse, Root, Silveira, Xue

Senior Instructors A. Carlson, Kesterson

Instructors Beauregard, Bushnell, Ferguson, Gamble, Helman, Myers, Sanders, Trail, Wright

Assistant to the Director Chandler

Academic Advisor Oliveros
Senior Research Assistant Russell
Faculty Research Assistant Jeffers

Undergraduate Majors

Applied Visual Arts (BFA, HBFA)

Options

Fine Arts BFA

Photography BFA

Art (BA, BS, HBA, HBS)

Options

Art History (BA, HBA)

Fine Arts (BA, BS, HBA, HBS)

Photography (BA, BS, HBA, HBS)

Digital Communication Arts

(BA, BS, BFA, HBA, HBS, HBFA)

Music (BA, BS, HBA, HBS)

Options

Instrumental Performance

Music Education

Music Production

Piano Performance

Popular Music Studies

Vocal Performance

Speech Communication

(BA, BS, HBA, HBS)

Options

Communication

Theatre Arts

Minors

Art History

Communication

Multimedia

Music (for nonmajors)

New Media Communications

Photography

Popular Music Studies

Theatre Arts

Visual Arts

Graduate Minors

Art

Graduate Areas of Concentration

Art History

Fine Arts

Photography

Music

Graduate Areas of Concentration

Composition

Conducting

Music Education

Performance

Speech Communication

Graduate Areas of Concentration

Interpersonal and group communication

Rhetoric and social influence

Theatre arts costume and scene design

Theatre arts directing, performance, and management

Theatre arts history, criticism/literature, and playwrighting

ART

The Art Area of the School of Arts and Communication offers Bachelor of Fine Arts (BFA), Bachelor of Arts (BA), and Bachelor of Science (BS) degrees through extensive course work in fine arts, photography, and art history.

The curriculum provides an awareness and understanding of the historical and contemporary significance of art as a unique feature of society. Major programs offer the opportunity for professional artistic development while incorporating subjects that lead to a liberal education. These programs prepare the student for a range of professional opportunities or later graduate study in photography, fine art, and art history, as well as many related fields. As a cultural enrichment for our students, the Art Area sponsors exhibitions, lectures, workshops, and other events related to the visual arts.

Candidates for the BFA degree may select an option in fine arts or photography. Candidates for the BS degree may select the fine arts or photography option. Candidates for the BA degree may select an option in fine arts, art history, or photography. The BFA is a pre-professional degree. The College of Liberal Arts requirements for the BFA differ from other degree programs. (See BFA/Applied Visual Arts.) Admission into either the Fine Arts or Photography option is selective and competitive. See program requirements for specific details.

The Art History minor combines an introduction to art history with an opportunity to explore advanced topics. The Visual Arts minor is a studio concentration in either fine arts or photography. The Art Area also participates in the New Media Communications minors and Digital Communication Arts major, as well as the Master of Arts in Interdisciplinary Studies (MAIS).

MONTHLY ART EXHIBITIONS

The Art Area of the School of Arts and Communication, based in Fairbanks Hall, features monthly exhibitions by nationally and internationally recognized artists in the Fairbanks Gallery. The school is also the sponsor of the Visiting Artists and Scholars Lecture Series, which has brought in renowned artists including Philip Pearlstein, Ann Hamilton, Marina Abramović, Bill Viola, and Do Ho Suh. In 1995 the school created the JumpstART *Precollege Visual and Performing Arts Workshop* held each summer for talented high school students in art, music and theater.

MUSIC

The Music Area of the School of Arts and Communication offers programs leading to the Bachelor of Arts (BA) or Bachelor of Science (BS) degree, a variety of baccalaureate core courses for students with little or no background in music,

and opportunities for qualified students to perform in bands, choirs, and the symphony orchestra. Students wishing a greater curricular choice may wish to combine music study with courses in another school or department in the College of Liberal Arts for a liberal studies major. The Music Area also offers minors in Music and Popular Music Studies.

The Music Area also teaches graduate courses in music education, literature and history, conducting, performance and special projects. Graduate students may pursue the Master of Arts in Teaching: Music Education (MAT) degree or the Master of Arts in Interdisciplinary Studies (MAIS) degree in a broad range of fields. OSU's graduate programs in music have been approved by Oregon's Teacher Standards and Practices Commission and the National Council for Accreditation of Teacher Education. Programs are available for individuals seeking both the initial and/or continuing license in music at all levels of authorization.

Performance instruction at the intermediate and advanced levels is available with instructor consent. Students should contact the school office for application procedures and fee schedules.

The Music Area proudly presents upwards of 200 musical events of all types throughout the academic year and summer. Choral, instrumental, orchestral ensembles of all sizes and types provide students from across campus the chance to participate in and/or simply enjoy listening to music. Many ensembles and events include the chance to work with and learn from professional musicians and nationally and internationally-recognized music educators.

Scholarships are available for music majors and for outstanding performers. Auditions and interviews take place in February and March each year. Selection is based on musical and academic achievement.

The Sound Design Lab in Benton Hall includes state-of-the-art digital recording and editing hardware and software and is open to all OSU students. Work-study students are available to help students learn how to use the facilities.

Career possibilities in music include teaching in the schools, private instruction, performing in orchestras or ensembles, music librarianship, arts management, music business, and recording engineering.

NEW MEDIA COMMUNICATIONS

The New Media Communications (NMC) Area of the School of Arts and Communication offers Bachelor of Fine Arts (BFA), Bachelor of Arts (BA), and Bachelor of Science (BS) degrees in Digital Communication Arts. There is also a minor in New Media Communications. Course work explores the storytelling capacity of

contemporary media and technologies. When pursuing an NMC degree students acquire the skills they need to use today's media effectively in sharing knowledge, imagination, and information. Students also learn to anticipate how future changes in the media are likely to influence their lives. In NMC courses students explore how to make abstract concepts or hidden processes visible, how to anticipate people's reactions to innovation, how to write professionally, how to recognize the influence of media, how to produce creative content in a variety of media formats, and much more. A New Media Communications major prepares students for a lifetime of change and involvement in the digital world.

NMC courses are taught in multiple venues on campus including the Motion-Capture and Gaming labs, both currently located on the fourth floor of Strand Ag Hall.

Each year numerous New Media students participate in internships with on-campus organizations and off campus with local and regional companies. Selected students participate in the National Association of Broadcasters annual convention and other regional and national organizations and events.

SPEECH COMMUNICATION

The Communication Area of the School of Arts and Communication offers a major program leading to a Bachelor of Arts (BA) or Bachelor of Science (BS) degree. The degree examines both theoretical and practical aspects of human communication as a liberal art, as a social science, as background for further study, or as pre-professional experience. All students initially pursuing a Speech Communication major with an option in Communication take basic courses in public speaking, argumentation, and interpersonal communication. Further studies focus on areas such as rhetorical and communication theory, methods of criticism and research, and history. Students pursuing an option in Communication enhance the skills inherent in all human interactions, preparing themselves for a range of potential vocational pursuits, avocations, and graduate study. The area also offers a Communication minor.

The Communication Area is located in cottage-esque Shepard Hall on Campus Way. Communication Area students are active in *Lambda Pi Eta*, the National Communication Association's honor society for four-year colleges and universities. Students from across the university also compete on the nationally-recognized OSU Forensics Team in individual events and debate. Faculty and graduate students participate regularly in national and regional conferences as well as area-sponsored colloquia on campus.

The Communication Area also takes part in the Master of Arts in Interdisciplinary Studies (MAIS), with many master's students pursuing two areas of concentration within the area's graduate curriculum.

THEATRE ARTS

The Theatre Arts Area offers a Bachelor of Arts (BA) or Bachelor of Science (BS) degree option in theatre within the Speech Communication major. The Theatre Arts option emphasizes a liberal arts approach to theatre history, practice, and production. All students pursuing the degree complete a core of classes designed to introduce them to fundamental elements of the art. The large remaining portion of the option is split between courses in history/theory/literature and those focusing on design/technical/performance matters. Students select specific classes within each disciplinary area to match their interests (performance, design, literature, etc.) while meeting key degree requirements. The result is a theatre education grounded in a liberal arts perspective and emphasizing a basic knowledge of all theatre elements. The area offers a similarly structured minor in Theatre Arts.

The Theatre Arts Area facilities are located in Withycombe Hall. The Main Stage Theatre seats approximately 350 in a modified-proscenium arrangement while the flexible Laboratory Theatre seats around 100. Both spaces function as classrooms as well as performance venues.

The University Theatre (UT) is the producing arm of the Theatre Arts Area. Students from across campus collaborate with UT faculty, staff, and guest artists to create theatre productions throughout the academic year and summer. Students from all colleges and departments across campus are encouraged and welcome to participate.

The Theatre Arts Area also participates in the Master of Arts in Interdisciplinary Studies (MAIS) degree program.

UNDERGRADUATE MAJORS WITH OPTIONS

APPLIED VISUAL ARTS (BFA, CRED, HBFA)

Also available on the OSU-Cascades campus.

We offer two options in Applied Visual Arts:

1. Fine Arts BFA
2. Photography BFA

The Applied Visual Arts program is an interdisciplinary curriculum that enables students to gain a deeper understanding of their own ideas and how they relate to larger historical and cultural contexts. Courses at the 100 level stress fundamental aspects of visual literacy. Courses

numbered 200 through 499 offer increasingly intensive study in art history, painting, printmaking, photography, sculpture, expanded media, and drawing.

Requirements for BFA studio options in Applied Visual Arts:

Applied Visual Arts majors may not take required Art courses on an S/U graded basis. Students may not use courses in which they have earned less than a C– to satisfy BFA requirements. A minimum 3.00 grade-point average must be maintained in all art courses used to meet BFA requirements.

The core curriculum studio courses must be completed before taking upper-division studio courses for a major program. Applied Visual Arts majors are required to see the Art advisor on an annual basis.

Art Core Curriculum (33)

ART 100. Art Orientation (1)
ART 101. *Introduction to the Visual Arts (4)
ART 115. Foundations: 2-D (4)
ART 117. Foundations: 3-D (4)
ART 121. Foundations: Computers in Visual Arts (3)
ART 131. Foundations: Drawing I (4)
ART 204, ART 205, ART 206. *Introduction to Art History-Western (3,3,3)
ART 263. Digital Photography (4)

OPTIONS

FINE ARTS BFA OPTION

Lower Division (49)

Art Core Curriculum (33)
ART 100. Art Orientation (1)
ART 101. *Introduction to the Visual Arts (4)
ART 115. Foundations: 2-D (4)
ART 117. Foundations: 3-D (4)
ART 121. Foundations: Computers in Visual Arts (3)
ART 131. Foundations: Drawing I (4)
ART 204, ART 205, ART 206. *Introduction to Art History-Western (3,3,3)
ART 263. Digital Photography (4)

Art 200 Studio Courses (16):

ART 234. Drawing II/Figure (4)
ART 271. Printmaking I (4)
ART 281. Painting I (4)
ART 291. Sculpture I (4)

Upper Division (71)

ART 306. Advisor Review (1)
ART 366. History of Art (3)
ART 411. ^Contemporary Issues in Art (3)
Art History (300/400 level) (3 *credits may be ART 208; one course must be at the 400 level*) (9)
300-level Fine Arts (36)
400-level Studio Block (19)

Total=120

Note: The 400-level studio block may be any combination of painting, printmaking, sculpture, photography, or drawing courses.

PHOTOGRAPHY BFA OPTION

Admission to the photography program is selective and competitive. Students wishing to enter the program must undergo a portfolio review at the end of winter term of their sophomore year. Students should complete ART 101, ART 115, ART 121, and ART 261 during the freshman year. A review of portfolios will occur at the end of winter term the next year and students will be selected to fill a limited number of openings in the photography program based on performance in ART 261 and on the portfolio review. Academic performance in other courses may also be taken into account. (Transfer students should consult with an advisor in the School of Arts and Communication before registering for OSU courses.) Students who are unsuccessful in gaining admission to the photography program may reapply one time the following year. Contact the school for additional details.

Lower Division (50)

Art Core Curriculum (26)
ART 120. Foundations: Digital Imaging (3)
ART 121. Foundations: Computers in Visual Arts (3)
ART 261. Photography I (4)
Art Studio Electives (200 level) (12)

Upper Division (65)

ART 306. Advisor Review (1)
ART 341. Darkroom Photography II (4)
ART 346. Photo Illustration I (3)
ART 350. Photography for Publication (4)
ART 368. ^History of Photography (3)
ART 441. Photography III (4/4/4)(*Repeated 3 times*)
ART 445. Photo Illustration II (3)
ART 446. Documentary Photography (3/3)(*Repeated twice*)
Art History (300/400 level) (3 *credits may be ART 207*) (9)
Art Studio Electives (300/400 level) (12)

Total=115

ART (BA, BS, CRED, HBA, HBS)

We offer three options of study in art:

1. Art History
2. Fine Arts
3. Photography

The Art program is an interdisciplinary curriculum that enables students to gain a deeper understanding of their own ideas and how they relate to larger historical and cultural contexts. Courses at the 100 level stress fundamental aspects of visual literacy. Courses numbered 200 through 499 offer increasingly intensive study in art history, painting, printmaking, photography, sculpture, expanded media, and drawing.

Requirements for BA/BS Studio Options in Art:

Art majors may not take required art courses on an S/U graded basis.

The core curriculum studio courses must be completed before taking upper-division studio courses for a major program.

Art Core Curriculum (33)

ART 100. Art Orientation (1)
ART 101. *Introduction to the Visual Arts (4)
ART 115. Foundations: 2-D (4)
ART 117. Foundations: 3-D (4)
ART 121. Foundations: Computers in Visual Arts (3)
ART 131. Foundations: Drawing I (4)
ART 204, ART 205, ART 206. *Introduction to Art History-Western (3,3,3)
ART 263. Digital Photography (4)

ART HISTORY OPTION

Lower Division (27)

ART 101. *Introduction to the Visual Arts (4)
ART 115. Foundations: 2-D (4)
ART 131. Foundations: Drawing I (4)
ART 204, ART 205, ART 206. *Art History-Western (3,3,3)
ART 207. *Indigenous Art of the Americas (3)
Art studio electives (3)

Upper Division (30)

ART 469. ^Method and Theories of Art History (3)
Art History (300 level) (18)
Art History (400 level) (9)

Upper-division courses must include at least 3 credits of contemporary art history, 3 credits of global art history, and 3 credits of ancient, Medieval, Renaissance, or Baroque art history.

Total=57

FINE ARTS OPTION

Admission to the Fine Arts option is selective and competitive. Students seeking consideration must undergo a portfolio during winter term of their sophomore year. Students must first complete ART 101, ART 115, ART 117, ART 121, ART 131, and a minimum of two 200-level studio courses prior to the review.

In addition to the portfolio, both GPA and academic performance in other courses will be taken into consideration. (Transfer students should consult with an advisor in the School of Arts and Communication before registering for OSU courses). Students who are unsuccessful in gaining admission to the Fine Arts option program may reapply one time the following year. Contact the school for additional details.

Lower Division (45)

Art Core Curriculum (33)
ART 100. Art Orientation (1)
ART 101. *Introduction to the Visual Arts (4)
ART 115. Foundations: 2-D (4)
ART 117. Foundations: 3-D (4)
ART 121. Foundations: Computers in Visual Arts (3)
ART 131. Foundations: Drawing I (4)
ART 204, ART 205, ART 206. *Introduction to Art History-Western (3,3,3)
ART 263. Digital Photography (4)

Three courses from the following:

ART 234. Drawing II/Figure (4)
ART 271. Printmaking I (4)
ART 281. Painting I (4)
ART 291. Sculpture I (4)

Upper Division (35)

ART 366. History of Art (3)
 ART 411. ^Contemporary Issues in Art (3)
 Art history (300/400-level) (3 credits may be ART 208; at least one course must be at the 400 level) (6)

Fine Arts electives (300 level) (15)

Fine Arts electives (400 level) (8)

Note: Fine arts electives include studio courses in painting, printmaking, sculpture, drawing, or photography.

PHOTOGRAPHY OPTION

Admission to the photography program is selective and competitive. Students wishing to enter the program must undergo a portfolio review at the end of winter term of their sophomore year. Students should complete ART 101, ART 115, ART 121, and ART 261 during the freshman year. A review of portfolios will occur at the end of winter term the next year and students will be selected to fill a limited number of openings in the photography program based on performance in ART 261 and on the portfolio review. Academic performance in other courses may also be taken into account. (Transfer students should consult with an advisor in the School of Arts and Communication before registering for OSU courses.) Students who are unsuccessful in gaining admission to the photography program may reapply one time the following year. Contact the school for additional details.

Lower Division (39)

Art Core Curriculum (26)
 ART 121. Foundations: Computers in Visual Arts (3)
 ART 261. Photography I (4)
 Art Studio Electives (4)

Upper Division (30)

ART 341. Darkroom Photography II (4)
 ART 346. Photo Illustration I (3)
 ART 368. ^History of Photography (3)
 ART 441. Photography III (4)
 ART 446. Documentary Photography (3)
 Art History (300/400 level) (9)

Total=69

DIGITAL COMMUNICATION ARTS (BA, BFA, BS, CRED, HBA, HBFA, HBS)

The Digital Communication Arts major requires a 2.0 GPA for admittance and a 2.3 GPA for graduation. Students must receive a C- or better in all degree course work.

Core Requirements (33-35)

NMC 101. Introduction to New Media Communications (3)
 NMC 260. New Media Futures (3)
 NMC 301. ^Writing for the Media Professional (3)
 NMC 320. History of Telecommunications (3)
 or NMC 321. History of Broadcasting (3)
 or NMC 322. Landmarks in Media Content (3)
 NMC 351. New Media Visualization (3)
 NMC 409. Practicum (1) (*taken as three*)

1-credit courses or two 1-credit and one 2-credit courses)

or NMC 410. Internship (3)
 NMC 430. Media Theory (3)
 NMC 490. Media Ethics (3)
 NMC 498. Capstone Projects (3)

Students also must take one class from each of the two areas outside of their own specialty area as part of the core requirements (6-8)

Specialties

Students have the opportunity to focus their studies on a particular part of the discipline of New Media Communications. Students in Media Management and the Media and Society specialties must complete a minimum of 5 courses from the following list of specialty classes. Students may also choose the BFA in the Production specialty. Students must pursue a specialty to attain the BA/BS/HBA/HBS or BFA in Digital Communication Arts.

Media Management Specialty (15-16):

Students pursuing the Media Management specialty focus on business practices and the regulatory environment. Students learn effective strategies to form start-up ventures, understand communication regulation, policy, and law, and gain skills needed to manage media communications enterprises.

NMC 406. Special Problems/Special Projects (3-4)

NMC 421. *Diffusion of Innovations (3)

NMC 437. New Media and Society (3)

NMC 440. Media Management (3)

NMC 441. Media Entrepreneurship (3)

NMC 470. Media Law (3)

NMC 471. Telecommunications Policy (3)

Students pursuing the Media Management specialty will complete a BS/BA degree with a total of 48-51 credits.

Media and Society Specialty (15):

Students in this specialty study the intersection of media and social life. Throughout history, new media have produced profound changes in human interaction. Family life, politics, commerce, religion, and the distribution of privileges have all been subject to fundamental revision in the wake of new technologies for communication. This specialty provides students with theoretical and practical understanding of the nature of these changes, and prepares them to anticipate and manage inevitable future changes as the media landscape continues to evolve. This specialty is particularly appropriate for students who seek careers in media research and criticism, graduate studies in media, and work in media policy.

COMM 368. Propaganda and Social Control (3)

COMM 482. The Media in Culture and Society (3)

COMM 484. Media Criticism (3)

NMC 330. The Meaning of Video Games (3)

NMC 340. Social Media Strategy (3)
 NMC 421. *Diffusion of Innovations (3)
 NMC 427. *Digital Pornography (3)
 NMC 435. Media Effects (3)

Students pursuing the Media and Society specialty will complete a BS/BA degree with a total of 48-50 credits.

Production Specialty (BFA Students Only) (65-72):

The production specialty is designed to provide a foundation in media aesthetics, story conceptualization and preproduction planning for linear and nonlinear/interactive projects, video production, sound design and 3D modeling and animation. Students are encouraged to explore their own creativity within a carefully constructed curriculum that serves as a basis for independent work and portfolio development. Faculty members include artists, videographers, editors and composers from professional production environments.

A BFA can be earned by completing the DCA Core Requirements and the Production Specialty requirements. Students completing a BFA do not need to complete BS/BA requirements and CLA Core requirements.

Foundation Course Work (41-42)

ART 101. *Introduction to the Visual Arts (4)
 ART 115. Foundations: 2-D (4)

ART 120. Foundations: Digital Imaging (3)

ART 121. Foundations: Computers in Visual Arts (3)

ART 122. Foundations: 4-D (4)

ART 131. Foundations: Drawing I (4)

ART 263. Digital Photography (4)

NMC 330. The Meaning of Video Games (3)

TA 242. Visual Principles of Theatre (3)

TA 346. Scene and Stage Design (3)

WR 407. Seminar: *Screenwriting* (3)

One of the following:

ART 206. *Introduction to Art History - Western (3)

FILM 125. *Introduction to Film Studies: 1945-Present (3)

FILM 245. *The New American Cinema (4)

FILM 265. *Films for the Future (4)

Production Course Work (select 8 courses) (24-30)

MUS 493. Basic Recording Techniques (3)

MUS 494. Intermediate Recording Techniques (3)

MUS 495. Advanced Recording Techniques (3)

MUS 496. Surround Sound Recording and Mastering (2)

NMC 302. Reporting (3)

NMC 305. Copyediting (3)

NMC 380. Pre-Production (3)

NMC 382. Studio and Multicamera Production (4)

NMC 383. Field Production (4)

NMC 409. Practicum (*variable credit, 3 required*) (3)

NMC 433. New Media Story Telling (3)

NMC 481. Post Production (4)

NMC 482. Documentary (4)

NMC 483. New Media 3-D (4)

NMC 484. New Media Animation (4)

Students pursuing the Digital Communication Arts Production BFA will take a total of approximately 98–107 total credits from the course work listed above to complete the major. The degree does not require the College of Liberal Arts Core or the college's BA/BS requirements. The requirements within the major exceed those of the CLA core making it redundant.

Additional Electives:

The following may be used as additional electives in combination with those listed above to augment individual learning goals and credits for all of the degree options presented:

- COMM 180. Introduction to the Rhetoric of the Film (3)
 NMC 401. Research and Scholarship (3–4)
 NMC 402. Independent Study (3–4)
 NMC 403. Thesis/Dissertation (3–4)
 NMC 404. Writing and Conference (3–4)
 NMC 405. Reading and Conference (3–4)
 NMC 406. Special Problems/Special Projects (3–4)
 NMC 407. Seminar (3–4)
 NMC 408. Workshop (3–4)
 NMC 410. Internship (3–4)
 NMC 499. Special Topics (3–4)
 TA 244. Scene Crafts (3)
 TA 245. Stage Lighting (3)
 TA 248. Fundamentals of Acting I (3)
 TA 249. Fundamentals of Acting II (3)
 TA 346. Scene and Stage Design (3)
 TA 351. Principles of Playwriting (3)
 TA 354. Fundamentals of Play Direction (3)

Complementary minors and secondary majors include Art, Music, Theatre Arts, Computer Science, Business and the International Studies degree. Additionally, students from other scientific and professional fields are increasingly interested in visual technological applications to analyze, interpret and communicate data. These students will find utility in digital communication arts course work and minors as well.

Total=48–51 credits for the BA/BS degrees

Total=98–107 credits for the BFA

MUSIC (BA, BS, CRED, HBA, HBS)

Departmental degree requirements are 47 credits, of which 24 must be upper division. **Note:** College of Liberal Arts allows only 12 credits of MUP courses to be applied toward a degree.

A grade of C– or better is required for all courses used to complete music major requirements. These courses cannot be taken with S/U grading.

Transfer students must demonstrate competency in the areas of music history, music theory, aural skills, and piano skills. Placement examinations in each of these areas must be completed by Wednesday of the first week of classes.

Required Core Classes for ALL options/emphases:

- MUS 177. Group Lessons, Piano (1)
 MUS 121, MUS 122, MUS 123. Literature and Materials of Music I (3,3,3)
 MUS 125, MUS 126. Literature and Materials of Music Lab I, II (1,1)
 MUS 135, MUS 136. Aural Skills I (1,1)
 MUS 221, MUS 222, MUS 223. Literature and Materials of Music (3,3,3)
 MUS 315. Introduction to Conducting (2)
 MUS 321. Literature and Materials of Music III (3)
 MUS 324. History of Western Music (3)
 MUS 325. *History of Western Music (3)
 MUS 326. History of Western Music (3)
 Upper-division Electives (10)

Total=47

Footnote:

* Baccalaureate Core Course

OPTIONS

INSTRUMENTAL PERFORMANCE OPTION

Application may be made upon acceptance to 300-level individual lessons and with permission of the faculty program director.

- MUP 390–MUP 395. Individual Lessons (1–2) **Take 6 credits**
 MUP 490–MUP 495. Individual Lessons (1–2) **Take 6 credits**
 MUS 183. Group Lessons: Piano (1)
 MUS 234, MUS 235, MUS 236. Aural Skills II (1,1,1)
 MUS 340–MUS 369. Performance Organizations (6)
 Upper-division Music Technology (9)
 Upper-division Electives (6)
 Junior Recital (0)
 Senior Recital (0)

Total=37

MUSIC EDUCATION OPTION

Choral Emphasis

Application may be made upon acceptance to 300-level individual lessons, completion of MUED 353 and with permission of the faculty program director.

- MUED 353. Introduction to Music Education (3)
 MUED 471. Fundamentals of Music for Elementary Classroom Teachers (3)
 MUED 477. Classroom Instrumental Techniques (2)
 MUED 478. Techniques for the Vocal Instructor (2)
 MUP 391–MUP 491. Individual Lessons (1–2) **Take 5 credits**
 MUS 140–147. Choral Ensembles (3)
 MUS 183. Group Lessons: Piano (1)
 MUS 234, MUS 235, MUS 236. Aural Skills II (1,1,1)
 MUS 316, MUS 317. Choral Conducting (2,2)
 MUS 340–MUS 347. Choral Ensembles (1–2) **Take 3 credits**
 MUS 399. Special Studies: Choral Conducting Lab (2)
 MUS 472. Italian and Latin Diction for Singers (2)

- MUS 473. German Diction for Singers (2)
 Junior **or** Senior Recital (0)

Total=37

Instrumental Emphasis

Application may be made upon acceptance to 300-level individual lessons, completion of MUED 353 and permission of faculty program director.

- MUED 277 (Sects. 001–008). Instrumental Techniques (1) **Take 8 credits**
 MUED 353. Introduction to Music Education (3)
 MUED 471. Fundamentals of Music for Elementary Classroom Teachers (3)
 MUED 478. Techniques for the Vocal Instructor (2)
 MUP 390–MUP 496. Individual Lessons (1–2) **Take 5 credits**
 MUS 183. Group Lessons: Piano (1)
 MUS 234, MUS 235, MUS 236. Aural Skills II (1,1,1)
 MUS 318, MUS 319. Instrumental Conducting (2,2)
 MUS 350–MUS 360. Instrumental Ensembles (1) **Take 6 credits**
 Junior **or** Senior Recital (0)

Total=35

General Emphasis

Application may be made after successful completion of MUED 353 and permission of faculty program director.

- MUED 277 (Sects. 001–008). Instrumental Techniques (1) **Take 4 credits**
 MUED 353. Introduction to Music Education (3)
 MUED 478. Techniques for the Vocal Instructor (2)
 MUP 190. Individual Lessons: Keyboard (1–2)
 MUP 191. Individual Lessons: Voice (1–2)
 MUP 192. Individual Lessons: Strings (Guitar) (1–2) **Take 4 credits**
 MUS 140–147. Choral Ensembles (3) **or** MUS 150–157. Instrumental Ensembles (3)
 MUS 183. Group Lessons: Piano (1)
 MUS 234, MUS 235, MUS 236. Aural Skills II (1,1,1)
 MUS 315. Introduction to Conducting (2)
 MUS 316, 317. Choral Conducting (2,2) **or** MUS 318, MUS 319. Instrumental Conducting (2,2)
 MUS 340–MUS 347. Choral Ensembles (1–2) **Take 3 credits** **or** MUS 350–MUS 360. Instrumental Ensembles (3) **Take 3 credits**
 MUS 399. Special Studies: Choral Conducting Lab (2)
 MUS 472. Italian and Latin Diction for Singers (2)
 Junior **or** Senior Recital (0)

Total=38–40

MUSIC PRODUCTION OPTION

Application may be made after successful completion of MUS 223 and with permission of the faculty program director.

Upper-division Requirements

- MUS 340–MUS 369. Performance Organizations (3)
 MUS 403. Thesis (3)

- MUS 443. Theory and Composition Studies (3,3,3)
 MUS 493. Basic Recording Techniques (3)
 MUS 494. Intermediate Recording Techniques (3)
 MUS 495. Advanced Recording Techniques (3)

Total=24

PIANO PERFORMANCE OPTION

Application may be made with permission from the piano program director.

- MUP 190, MUP 290. Individual Lessons: Keyboard (1–2) **Take 6 credits**
 MUP 390, MUP 490. Individual Lessons: Keyboard (1–2) **Take 6 credits**
 MUS 163. Accompanying (1) **Take 6 credits**
 MUS 183. Group Lessons: Piano (1)
 MUS 199. Special Studies: Pedagogy (3)
 MUS 234, MUS 235, MUS 236. Aural Skills II (1,1,1)
 MUS 363. Accompanying (1) **Take 6 credits**
 MUS 399. Special Studies (3)
 MUS 442. Genre Studies: *Piano Repertory* (3)
 Junior Recital (0)
 Senior Recital (0)

Total=37

VOCAL PERFORMANCE OPTION

Application may be made upon acceptance to 300-level individual lessons and with permission of the faculty program director.

- MUED 478. Techniques for the Vocal Instructor (2)
 MUP 391 Individual Lessons: Voice (1–2) **Take 6 credits**
 MUP 491. Individual Lessons: Voice (1–2) **Take 6 credits**
 MUS 183. Group Lessons: Piano (1)
 MUS 234, MUS 235, MUS 236. Aural Skills II (1,1,1)
 MUS 340–MUS 347. Choral Ensembles (1–2) **Take 6 credits**
 MUS 369. Opera Workshop (1–2) **Take 4 credits**
 MUS 442. Genre Studies: *Song and Oratorio* (3)
 MUS 442. Genre Studies: *Opera Literature* (3)
 MUS 472. Italian and Latin Diction for Singers (2)
 MUS 473. German Diction for Singers (2)
 MUS 474. French Diction for Singers (2)
 Junior Recital (0)
 Senior Recital (0)

Total=40

SPEECH COMMUNICATION (BA, BS, CRED, HBA, HBS)

Students majoring in Speech Communication must choose between a Communication option and a Theatre Arts option. Both options function as stand-alone majors.

The **Communication option** consists of 48 credits of course work. Students who choose the Communication option will be required to satisfactorily complete an undergraduate prerequisite core before applying (through the

School of Arts and Communication) to the major. Students who are working on completing the prerequisite core are placed in pre-communication.

The **Theatre Arts option** consists of 51 credits of course work. Students in theatre arts do not need to complete the undergraduate prerequisite core required in the Communication option. The course requirements for students pursuing a Theatre Arts option are held to a minimum with the intention of allowing the student and his or her faculty advisor to devise a program most suited to the student's specific needs and objectives.

Students pursuing the Bachelor's degree in Speech Communication must successfully complete the requirements of either the Communication option (48 credits) **or** Theatre Arts option (51 credits); the requirements of the Liberal Arts Core (15 cr); the Oregon State Baccalaureate Core (48 credits); and the requirements for the BA or BS.

OPTIONS

COMMUNICATION OPTION

The Communication option in the School of Arts and Communication consists of 48 credits. The undergraduate prerequisite core must be successfully completed before the student applies to the major through the School of Arts and Communication. Students completing the prerequisite core are placed in pre-communication until then.

Prerequisite Core:

- COMM 111. *Public Speaking (3)
 COMM 114. *Argument and Critical Discourse (3)
 COMM 218. *Interpersonal Communication (3)
 Completion of the Writing I and Writing II requirements of the baccalaureate core.
 A cumulative GPA of 2.00 or better

Communication Option:

- COMM 320. Introduction to Rhetorical Theory (3)
 COMM 321. Introduction to Communication Theory (3)

Choose one Communication Theory course (3):

- COMM 418. ^Interpersonal Communication Theory and Research (3)
 COMM 422. ^Small Group Communication Theory and Research (3)
 COMM 426. Intercultural Communication: Theories and Issues (3)
 COMM 430. Theoretical Issues in Communication Theory (3)
 COMM 440. Theories of Conflict and Conflict Management (3)

Choose one Rhetorical Theory course (3):

- COMM 454. Advanced Argumentation (3)
 COMM 456. ^Rhetoric: 500 BC to 500 AD (3)
 COMM 458. ^Rhetoric: 500 AD to 1900 (3)
 COMM 459. ^Contemporary Theories of Rhetoric (3)

COMM 466. Ethics of Rhetoric (3) Choose one Methods course (3):

- COMM 414. Communication Research Methods (3)
 COMM 416. Ethnography of Communication (3)
 COMM 464. Rhetorical Criticism (3) or another methods course outside the Dept. of Speech Communication as approved by advisor.

- **Electives:** 24 credits of electives are required in the Communication option with the following stipulations.
- A minimum of 2.0 GPA in course work used for the option is required (including the prerequisite core).
- One Writing Intensive Course (WIC) in the major is required.
- Six (6) elective credits must be taken at the 400 level. Variable credit courses cannot be used for this requirement.
- **Limitations:** Only 3 credits maximum of lower-division courses will be allowed for the elective portion of this option.
- Only 6 credits maximum of variable credit course work will apply to this option.

THEATER ARTS OPTION

Through the Degree Partnership Program (dual admission/enrollment) with Linn-Benton Community College, the Theatre Arts program at Oregon State University is building closer ties with LBCC's drama program. As this innovative program grows, theatre students from both schools will have more performance and production opportunities with greater access to a variety of performance venues and theatre faculty.

The Theatre Arts program is currently undergoing revisions. Check with the school for details.

- TA 147. *Introduction to the Theatre (3)
 TA 244. Scenecrafts (3)
 TA 247. Stage Makeup (3)
 TA 248. Fundamentals of Acting (3)
 TA 344. Playscript Analysis (3)
 History/Theory/Criticism courses (15)
 Performance studies courses (21)

In addition to course work, all majors must work on a production crew, act in a production, and serve in a front-of-house position.

UNDERGRADUATE MINORS

ART HISTORY MINOR

Art minors may not elect to take required art courses on an S/U graded basis.

- ART 101. *Introduction to the Visual Arts (4)
 ART 204, ART 205, ART 206. *Introduction to Art History-Western (3,3,3)
 ART 207. *Indigenous Art of the Americas (3)
 Upper-division art history courses including at least 3 credits at the 400 level (15)

Total=31

COMMUNICATION MINOR

Communication minors must complete 27 credits, 18 of which must be upper division.

Requirements

COMM 111. *Public Speaking (3)
 COMM 114. *Argument and Critical Discourse (3)
 COMM 218. *Interpersonal Communication (3)
 COMM 320. Introduction to Rhetorical Theory (3)
 or COMM 321. Introduction to Communication Theory (3)
 One 400-level course in COMM (3)
 Additional 12 credits of upper-division COMM courses (12)

Students may not use any variable credit courses toward their minor. Minors must take courses used to fulfill the requirements for a letter grade. A minimum GPA of 2.00 must be earned in communication course work.

MULTIMEDIA MINOR**New Media Communications Program**

207 Gilkey Hall
 Oregon State University
 Corvallis, OR 97331-6202
 541-737-4580
 Email: nmc@oregonstate.edu
 Website: http://oregonstate.edu/cla/liberal_studies/new-media-communications

The Multimedia minor consists of 36 to 38 credits. It is possible for students to complete the minor in two years, making it accessible for transfer students, as well as those who take all four years at OSU. For students majoring in computer science or any other subject offered at OSU, the minor must include 27 credits not used as part of the student's major program; 12 of the 27 credits must be upper division. All courses for the Multimedia minor must be taken for graded credit.

Multimedia Core (30)

CS 195. Introduction to Web Authoring (4)
 CS 295. Intermediate Web Authoring (4)
 CS 395. Interactive Multimedia (4)
 NMC 101. Introduction to New Media Communications (3)
 NMC 260. New Media Futures (3)
 NMC 320. History of Telecommunications (3)
 NMC 351. New Media Visualization (3)
 NMC 430. Media Theory (3)
 WR 201. *Writing for Media (3)

Choose two of the following:

COMM 322. Small Group Problem Solving (3)
 COMM 484. Media Criticism (3)
 CS 151. Introduction to C Programming (4)
 CS 495. Interactive Multimedia Projects (4)
 NMC 409. Practicum (3)
 NMC 410. Internship (3)
 NMC 421. *Diffusion of Innovations (3)
 NMC 435. Media Effects (3)
 NMC 440. Media Management (3)

NMC 441. Media Entrepreneurship (3)

Total=36–38

MUSIC MINOR

Students majoring in other disciplines may elect the Music minor.

MUS 121, MUS 122, MUS 123. Literature and Materials of Music I (3,3,3)
 Electives in music (6)

Upper-division electives in music from the following (12):

CS 395. Interactive Multimedia (4)
 MUED 477. Classroom Instrumental Techniques (2)
 MUED 478. Techniques for the Vocal Instructor (2)
 MUP 390–MUS 596.
 MUS 340. OSU Chamber Choir (1–2)
 MUS 350. Symphonic Band (1)
 MUS 357. Small Jazz Ensemble (1)
 MUS 360. University Symphony Orchestra (1)
 MUS 363. Accompanying (6 credits max.)
 MUS 324, MUS 325, MUS 326. History of Western Music (3,3,3)
 MUS 442. Genre Studies (3)
 MUS 443. Theory and Composition Studies (3)
 MUS 493. Basic Recording Techniques (3)
 MUS 494. Intermediate Recording Techniques (3)
 MUS 495. Advanced Recording Techniques (3)
 MUS 496. Surround Sound Recording and Mastering (2)
 PH 331. *Sound, Hearing, and Music (3)

Total=27

Footnote:

* Baccalaureate Core Course

NEW MEDIA COMMUNICATIONS MINOR**New Media Communications Program**

207 Gilkey Hall
 Oregon State University
 Corvallis, OR 97331-6202
 541-737-4580
 Email: nmc@oregonstate.edu
 Website: http://oregonstate.edu/cla/liberal_studies/new-media-communications

New Media Communications (NMC) minor focuses on mediated storytelling and the new media technology that makes it possible. This focus within the broader discipline of mediated communications capitalizes on the historic strengths of Oregon State University. NMC takes an innovative approach to the study of mediated communications. New Media Communications is devoted to the study of mediated communications and its impact on culture, technology and society.

Courses in the New Media Communications minor are designed to prepare students for a variety of careers in media and allied fields in which knowledge of and skills in mediated communications

are an integral part of professional activity. NMC offers students the opportunity to pursue a range of theoretical and practical courses in media.

An NMC minor will allow students from across campus to complement their chosen field of study with an understanding of mediated communications from a new media perspective. Students will better understand how to process information they receive about their chosen field and how to distribute information about their own work effectively in society. The minor in New Media Communications will assist students in attaining the background necessary for leadership roles in their chosen fields.

All courses for the New Media Communications minor must be taken for graded credit.

Core Requirements (15)

NMC 101. Introduction to New Media Communications (3)
 NMC 260. New Media Futures (3)
 NMC 320. History of Telecommunications (3)
 NMC 351. Visual Media Communications (3)
 NMC 409. Practicum (1,1,1)
 Electives (15–16)

Students must select 5 courses from the following list of electives. Students have the opportunity to focus their studies on a particular part of the discipline of new media communications.

NMC 383. Field Production (4)
 NMC 409. Practicum (1–3) (*may be taken for an additional total of 3 credits*)
 NMC 421. *Diffusion of Innovations (3)
 NMC 430. Media Theory (3)
 NMC 435. Media Effects (3)
 NMC 437. Mass Media and Society (3)
 NMC 440. Media Management (3)
 NMC 441. Media Entrepreneurship (3)

Total Requirements=30–31

Footnote:

* Baccalaureate Core Course

PHOTOGRAPHY MINOR

The Photography minor creates an opportunity for non-Photography majors to study and practice photography, digital imaging and collaborative digital arts practices. Through the study of a diverse range of photographic genres and techniques, students actively practice photography, develop critical-thinking skills, study the histories of photography and key photographic practitioners, have the option to experience other time-based media genres, and further their photography skills by creating professional-level projects.

The role of photography to improve creative thinking skills is invaluable for students studying in other fields where the role of creativity as an aspect of inventiveness and independent project generation is encouraged. Furthermore, a photography minor is an ideal

companion to students majoring in the Design fields or in Digital Media Arts - students in these areas already share several courses in common with art/photography students.

To qualify as a Photography Minor, you must declare the minor when filing the application for graduation, and you must have 27 credits in photography and art history at least 12 must be upper-division. For further information please contact the academic advisor.

Required Photography Courses (16 credits)

ART 263. Digital Photography (4)
ART 340. Darkroom Photography I (4)
ART 345. Intermediate Photography (4)
ART 347. Photography: Studio Lighting (4)

Photography Electives (11 credits) Choose 11 credits from the following:

ART 122. Foundations: 4-D (4)
ART 339. Professional Practices in Photography (3)
ART 341. Darkroom Photography II (4)
ART 346. Photo Illustration (3)
ART 348. Concepts in Digital Imaging (4)
ART 349. Video Art (4)
ART 354. Alternative Processes in Photography (4)
ART 368. ^History of Photography (3)
ART 409. Practicum Student Media (1)
ART 441. Photography III (4)
ART 446. Documentary Photography (3)
ART 456. Portfolio-Photography/Video Art (4)

Total=27

Footnote:

^ Writing Intensive Course

POPULAR MUSIC STUDIES MINOR

Also available via Ecampus.

The online Popular Music Studies minor, offered only via Ecampus, creates an opportunity for students to examine popular music as a cultural and social practice. The minor provides students with literacy in several popular music genres of their choice, including rock n' roll, hip hop, film music, reggae, Broadway music, music technology and jazz. Through the study of a diverse range of genres, stylistic practices, performance media, and music as a commercial enterprise, students will develop analytical and critical skills to examine musical meaning through the lens of community, music production, and identity.

This minor does not require an audition or ability to read music.

Choose 12 Lower-Division credits from below:

MUS 102. *Music Appreciation II: Periods and Genres: *Hip Hop. Theory and Practice* (3)
MUS 102. *Music Appreciation II: Periods and Genres: *Film Music. Theory and Practice* (3)
MUS 102. *Music Appreciation II: Periods and Genres: *Musical Theater* (3)

MUS 102. *Music Appreciation II: Periods and Genres: *Rock and Roll* (3)

MUS 102. *Music Appreciation II: Periods and Genres: *Jazz* (3)

MUS 102. *Music Appreciation II: Periods and Genres: *Reggae* (3)

MUS 102. *Music Appreciation II: Periods and Genres: *Introduction to Popular Music Theory and Practice* (3)

MUS 103. *Music Appreciation III: Great Composers: *The Beatles* (3)

MUS 103. *Music Appreciation III: Great Composers: *Bob Marley (Reggae)* (3)

MUS 103. *Music Appreciation III: Great Composers: *Bob Dylan (Folk)* (3)

MUS 103. *Music Appreciation III: Great Composers: *Madonna and Video Culture* (3)

MUS 108. *Music Cultures of the World (3)

Choose 15 Upper-Division from below:

MUS 402. Independent Study: Capstone Project (3)

MUS 410. Internship (3)

MUS 442. Genre Studies: *Advanced Studies in Popular Music Theory and Practice* (3)

MUS 442. Genre Studies: *Women in Popular Music* (3)

MUS 442. Genre Studies: *Advanced Studies in Hip Hop* (3)

MUS 442. Genre Studies: *Regional Studies in World Popular Music (India, Indonesia, Africa, Latin America)* (3)

MUS 442. Genre Studies: *Advanced Studies in Rock and Roll* (3)

MUS 442. Genre Studies: *The Blues and African American Music* (3)

MUS 442. Genre Studies: *Music Video, MTV and American Culture* (3)

MUS 443. Theory and Composition Studies: *Advanced Studies in Film and Gaming Music* (3)

MUS 493. Basic Recording Techniques (3)

Footnote:

* Baccalaureate Core Course

THEATER ARTS MINOR

Required

TA 144. Playreading (1) (*May be repeated once for a total of 2 credits*)

TA 147. *Introduction to the Theatre (3)

TA 244. Scenecrafts (3)

TA 248. Fundamentals of Acting (3)

TA 344. Playscript Analysis (3)

In addition, students choose 15 additional credits, 12 of which must be at the upper-division level.

Activity credits (TA 250–TA 350) may not be counted toward the minor.

Minors are strongly encouraged to participate fully backstage, on stage, and front-of-house.

Total=28

VISUAL ARTS MINOR

Art minors may not elect to take required art courses on an S/U graded basis.

ART 115. Foundation: 2-D (4)

ART 117. Foundation: 3-D (4)

ART 131. Foundations: Drawing I (4)

ART 234. Drawing II/Figure (4)

Studio courses in an approved program that includes at least 12 credits of upper-division courses (15)

Total=31

GRADUATE MINORS

ART GRADUATE MINOR

Graduate Areas of Concentration

Art history, fine arts, photography

The School of Arts and Communication offers graduate work leading to the Master of Arts in Interdisciplinary Studies (MAIS) and toward minors in other advanced degree programs. Emphasis may be in fine arts, art history, or photography. These fields offer sufficient depth to provide a strong minor.

MUSIC GRADUATE MINOR

Graduate Areas of Concentration

Composition, conducting, music education, performance

The School of Arts and Communication participates in the Master of Arts in Interdisciplinary Studies degree and Master of Arts in Teaching degree. Contact the school for entrance requirements for the MAT degree. Areas of specialization include performance, conducting, composition, music history, and music education.

Music Education

Through the School of Arts and Communication, graduate students may participate in the following programs: Professional Music Teacher Education, the Master of Arts in Teaching (MAT), the Master of Arts in Interdisciplinary Studies (MAIS), and the Master of Education (EdM) with a focus in music education. The school offers graduate courses in music, music education, and music performance. OSU's music education program is approved by state of Oregon Teachers Standards and Practices Commission (TSPC) and the National Council for Accreditation of Teacher Education (NCATE). With careful planning, students may complete both the initial and continuing teaching licensure requirements, as well as a master's degree. For more information, contact the Music Education Coordinator, Oregon State University, 101 Benton Hall, Corvallis, OR 97331.

SPEECH COMMUNICATION GRADUATE MINOR

Graduate Areas of Concentration

Interpersonal and group communication; rhetoric and social influence; theatre arts costume and scene design; theatre arts directing, performance, and management; theatre arts history, criticism/literature, and playwrighting

■ ART COURSES

ART 100. ART ORIENTATION (1). Introduction to the study of art and career options in fine arts, graphic design, photography, and art history.

ART 101. *INTRODUCTION TO THE VISUAL ARTS (4). An introductory lecture course using visual materials with emphasis on methods and motivations that generate the visual experience, both past and present. (FA) (Bacc Core Course)

ART 115. FOUNDATIONS: 2-D (4). Studio course that introduces the visual language, the elements of design, and the principles of organization. Emphasizes skills, concepts, and problem solving in the areas of two-dimensional design and color. (FA)

ART 117. FOUNDATIONS: 3-D (4). Studio course examining three-dimensional design elements and their spatial organization. Emphasizes innovative problem solving and exposure to varied media. Gives students a sound conceptual basis to apply to more advanced media-oriented courses. **PREREQS:** ART 115

ART 120. FOUNDATIONS: DIGITAL IMAGING (3). Capturing, processing, and publishing digital images. Image control and manipulation. Digital images in print and electronic media.

ART 121. FOUNDATIONS: COMPUTERS IN VISUAL ARTS (3). An introductory course covering computer software for drawing and page layout and applications in art and design.

ART 122. FOUNDATIONS: 4-D (4). Introduction to video art. Aesthetics, history, and techniques. Video as installation. Role of audience, race, gender, identity. Lec/lab. **PREREQS:** ART 120 and ART 121

ART 131. FOUNDATIONS: DRAWING I (4). Introductory studio course in drawing techniques with emphasis on developing skills in perception and visual organization. (FA)

ART 199. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ART 204. *INTRODUCTION TO ART HISTORY - WESTERN (3). A historical survey of architecture, painting, sculpture, and crafts, from prehistory to the present, with emphasis on the development of Western art. Recommended that sequence be taken in order. (H) (Bacc Core Course)

ART 205. *INTRODUCTION TO ART HISTORY - WESTERN (3). A historical survey of architecture, painting, sculpture, and crafts, from prehistory to the present, with emphasis on the development of Western art. Recommended that sequence be taken in order. (H) (Bacc Core Course)

ART 206. *INTRODUCTION TO ART HISTORY - WESTERN (3). A historical survey of architecture, painting, sculpture, and crafts, from prehistory to the present, with emphasis on the development of Western art. Recommended that the sequence be taken in order. (H) (Bacc Core Course)

ART 207. *INDIGENOUS ART OF THE AMERICAS (3). A historical survey of native arts of South, Central, and North America, including architecture, painting, sculpture, ceramics, textiles, basketry, and beadwork, from prehistory to present. (NC) (Bacc Core Course)

ART 208. *INTRODUCTION TO ASIAN ART (3). Introduces the distinctive, yet related, aesthetic traditions of South and Southeast Asia, Inner Asia, and East Asia. It focuses on architectural sites, sculptures, and paintings from prehistory to the present. (Bacc Core Course)

ART 215. COLOR IN THE VISUAL ARTS (4). Studio course following ART 115 and ART 117 that examines the properties of colors and their interaction. Emphasizes problem solving and the experimental use of color. **PREREQS:** ART 115

ART 234. DRAWING II/FIGURE (4). Drawing from the life model with emphasis on skill and

conceptual awareness as well as anatomical consideration. **PREREQS:** ART 131

ART 261. PHOTOGRAPHY I (4). Introductory studio course in photography with creative expression and innovative possibilities stressed. Includes problems in visual theory; demonstrations and lectures on both the technical and historical growth of the medium. Student must supply suitable 35mm camera. Lec/studio. (FA)

ART 263. DIGITAL PHOTOGRAPHY (4). Studio course in digital photography. The digital camera. Digital exposure. Digital color. Workflow. Digital output. Location lighting. Students must have the use of a digital single lens reflex camera. **PREREQS:** ART 115 and ART 120 are recommended.

ART 271. PRINTMAKING I (4). Introduction to the basic processes of printmaking, with options among relief, lithography, intaglio, screen printing and monotype. **PREREQS:** (ART 115 and ART 131)

ART 281. PAINTING I (4). Introductory studio course with emphasis on basic materials and techniques in painting. (FA) This course is repeatable for a maximum of 12 credits. **PREREQS:** ART 131

ART 291. SCULPTURE I (4). Studio course in basic materials and approaches used in sculpture; a foundation for further three-dimensional work. (FA) **PREREQS:** ART 117 and Art core strongly recommended.

ART 306. ADVISOR REVIEW (1). A review, conducted by the student's advisor and another faculty member of the student's choosing, of work produced to date in the student's area of concentration. Graded P/N. **PREREQS:** Placement Test and departmental approval required. For BFA students only.

ART 310. *EARLY CHINESE ART AND ARCHAEOLOGY (3). Introduces major forms of Chinese art from the Neolithic period to the Tang dynasty (618-907 CE) and related major archaeological finds. Stresses the materials and processes of making art, development of representational art, and the role of visual arts in an aristocratic and religious culture. (Bacc Core Course)

ART 313. *ART OF JAPAN (3). Surveys the arts of Japan from the prehistoric period to the twentieth century. (Bacc Core Course)

ART 331. DRAWING CONCEPTS (4). Studio course emphasizing drawing composition as an investigative, conceptualizing and communicative nonverbal language. Independent thinking, problem solving, and creative development encouraged. This course is repeatable for a maximum of 12 credits. **PREREQS:** ((ART 131* and ART 234**)) and (Placement Test or Placement Test)

ART 334. DRAWING III: FIGURE (4). Intermediate study of the human figure utilizing life models, the skeleton, and anatomy texts. Emphasis on gaining greater knowledge of the body's underlying structure and potential for aesthetic expression. This course is repeatable for a maximum of 12 credits. **PREREQS:** (ART 234 and (Placement Test or Placement Test)) and Art core curriculum.

ART 339. PROFESSIONAL PRACTICES IN PHOTOGRAPHY (3). Professional practices appropriate for photographic-artists and those planning to run a photographic business. Topics include portfolio development, presentation skills, project-planning, contracts, permissions, copyright, promotional campaigns, pricing, grants, exhibition opportunities, business structures, and marketing strategies. This course is repeatable for a maximum of 6 credits. **PREREQS:** ART 263 and an additional two photography courses are recommended as prerequisites for this course.

ART 340. DARKROOM PHOTOGRAPHY I (4). Studio course in black-and-white film exposure and development, and printing in the darkroom. The medium of silver-based black-and-white

photography is explored as a communication mode and art form. Historical, conceptual, technical and legal aspects of traditional wet processing are surveyed. Access to a single lens reflex (SLR) film camera is required. Course fee. **PREREQS:** ART 263 Digital Photography is required for Photography majors. No prerequisite or prior darkroom experience is required for non-Photography majors.

ART 341. PHOTOGRAPHIC TECHNIQUES (3). Demonstration of the zone system, photographic chemistry, and archival processes. **PREREQS:** (Placement Test or Placement Test) and Art core curriculum and ART 262

ART 345. INTERMEDIATE PHOTOGRAPHY (4). Emphasis is on both technical and aesthetic expression of digital color photography, from initial image capture, color management to finished print along with color symbolism and composition. Exploration of narrative, sequencing and image-series concepts. Introduction to contemporary color photographers. Lab. **PREREQS:** ART 263

ART 346. PHOTO ILLUSTRATION I (3). Studio lighting. The 4x5 view camera. Sheet film. Black-and-white and color illustration. **PREREQS:** (Placement Test or Placement Test) and ART 262 and Art core curriculum

ART 347. PHOTOGRAPH: STUDIO LIGHTING (4). Practical studio class surveying the basic principles and application of light in the creation of photographs. The development of craft and technique inside the studio will be emphasized but formal and conceptual considerations related to light and photography will also be explored. **PREREQS:** ART 263 and ART 345

ART 348. CONCEPTS IN DIGITAL IMAGING (4). Approaches to non-traditional and the manipulated image in digital photography with an emphasis on producing personal imagery. Introduction to the history of the manipulated image in photography and to contemporary approaches to digital photography. **PREREQS:** ART 263 and ART 121 is recommended as some prior Photoshop knowledge is required.

ART 349. VIDEO ART (4). Studio course in video art and time-based media projects. Emphasis on experimental approaches to video art in a contemporary art context, linear and non-linear video production and the projection and screening of video art projects. Introduction to the history of video art as an art form. Lec/studio. **CROSSLISTED** as NMC 349. This course is repeatable for a maximum of 8 credits. **PREREQS:** ART 122 and ART 263 and ART 345

ART 350. PHOTOGRAPHY FOR PUBLICATION (4). An introduction to reportorial photography. Shooting and editing for content. Special techniques and processes. Basic photographic layout. History, law, and ethics. **PREREQS:** (ART 261 and (Placement Test or Placement Test) and ART 262 and Art core curriculum

ART 351. INSTALLATION (4). Studio/lecture course designed to acquaint the student with the possibilities of using non-traditional means such as site, time, and interaction to communicate ideas. **PREREQS:** (ART 291 and (Placement Test or Placement Test) and foundation curriculum.

ART 354. ALTERNATIVE PROCESSES IN PHOTOGRAPHY (4). Historical photographic printing methods in use today e.g. cyanotype, gum bichromate and more. Use of digital and analog negatives, mixing emulsions and coating paper by hand. **PREREQS:** ART 263 and ART 345 and ART 340

ART 360. HISTORY OF ART (3). Early Renaissance art. Lecture course on the principal stylistic manifestations of European architecture, painting, and sculpture from the late Middle Ages to 1750. **PREREQS:** ART 204 and ART 205 and ART 206

ART 361. HISTORY OF ART (3). High Renaissance art and mannerism. Lecture

course on the principal stylistic manifestations of European architecture, painting, and sculpture from the late Middle Ages to 1750. This course is repeatable for a maximum of 6 credits. **PREREQS:** ART 204 and ART 205 and ART 206

ART 363. HISTORY OF ART (3). Baroque art. Lecture course on the principal stylistic manifestations of European architecture, painting, and sculpture from the late Middle Ages to 1750. This course is repeatable for a maximum of 6 credits. **PREREQS:** ART 204 and ART 205 and ART 206

ART 364. HISTORY OF ART (3). Late eighteenth-century neoclassicism and the nineteenth century. Lecture course covering the principal movements and trends in architecture, painting, and sculpture in Europe and America since 1750. This course is repeatable for a maximum of 6 credits. **PREREQS:** ART 204 and ART 205 and ART 206

ART 365. HISTORY OF ART (3). Twentieth-century art from 1900 to 1945. Lecture course covering the principal movements and trends in architecture, painting, and sculpture in Europe and America. **PREREQS:** ART 204 and ART 205 and ART 206

ART 366. HISTORY OF ART (3). Art since 1945. Lecture course covering the principal movements and trends in architecture, painting, and sculpture in Europe and America. **PREREQS:** ART 204 and ART 205 and ART 206

ART 367. *HISTORY OF DESIGN (3). A survey of the impact of technology on the visual qualities of graphic, advertising, fashion, architecture, and industrial design from the Victorian Arts and Crafts Movement to the computer age. (Bacc Core Course)

ART 368. ^HISTORY OF PHOTOGRAPHY (3). The development of photographic processes and applications. Influential figures. From the early beginnings to contemporary trends. (Writing Intensive Course)

ART 375. PRINTING: RELIEF (4). Studio course in relief printmaking with emphasis on linocut and woodcut; may include other relief processes, i.e. photo polymer plate. Black-and-white and color. **PREREQS:** (Placement Test or Placement Test) and Art core curriculum.

ART 376. PRINTMAKING: INTAGLIO (4). Studio course in intaglio printmaking with emphasis on drypoint, line etching, aquatint, softground and photo process. Black-and-white and possibly color for final project. **PREREQS:** (Placement Test or Placement Test) and Art core curriculum.

ART 377. PRINTMAKING: LITHOGRAPHY (4). Studio course in lithographic printmaking with emphasis on graining the stone, drawing with crayon and tusche, etching and reworking, inking and printing lithographic limestone. Black-and-white and possibly color for final project. **PREREQS:** (Placement Test or Placement Test) and Art core curriculum.

ART 378. PRINTMAKING: MONOTYPE (4). Studio course in monotype printmaking with emphasis on drawing/painting with brushes, oil pastels, watercolors, water-based crayons, inking with a lithographic roller and printing with an etching press. Black-and-white and color. **PREREQS:** (Placement Test or Placement Test) and Art core curriculum.

ART 379. PRINTMAKING: SCREEN PRINTING (4). Studio course in screen printing with emphasis on paper stencil, drawing fluid and photo emulsion processes. Students are exposed to a range of techniques and concepts are encouraged to investigate personal motivations while making multiple color prints. **PREREQS:** (ART 115 and (Placement Test or Placement Test) and Art core curriculum. ART 100, ART 101, ART 117, ART 131, ART 204, ART 205, ART 206 are recommended. Or instructor approval.

ART 381. PAINTING THE FIGURE (4). Studio course with emphasis on painting from the live

model; understanding the figure in terms of color, form and composition, the figure as symbol, implied narrative and vehicle of expression. This course is repeatable for a maximum of 9 credits. **PREREQS:** (ART 281 and (Placement Test or Placement Test) and ART 234 and Art core curriculum.

ART 382. PAINTING II: CONCEPTS (4). Painting with emphasis on experimentation and an exploratory investigation of mixed media, new media, collage, and assemblage, utilizing either representation or abstraction. This course is repeatable for a maximum of 8 credits. **PREREQS:** (ART 281 and (Placement Test or Placement Test) and Art core curriculum.

ART 383. PAINTING II: ABSTRACT AND MULTIMEDIA (4). Intermediate studio course with emphasis on contemporary directions in painting: abstraction and non-literal approaches. This course is repeatable for a maximum of 12 credits. **PREREQS:** (ART 281 and (Placement Test or Placement Test) and Art core curriculum.

ART 384. PAINTING II: NEW GENRE (4). Exploration of current directions in painting using traditional and non-traditional concepts and techniques. This course is repeatable for a maximum of 12 credits. **PREREQS:** (ART 281 and (Placement Test or Placement Test)

ART 385. PAINTING III: ENCAUSTICS (4). Exploration and application of a variety of traditional and non-traditional techniques using encaustics paint; beeswax and pigment fused to a surface. **PREREQS:** ART 131 and ART 281 recommended or instructor approval.

ART 386. A CULTURAL HISTORY OF AMERICAN ART AND LITERATURE: PART I (3). The first in an interdisciplinary sequence of courses that examines the development and interrelationships of American art and literature from contact to the present. ART 386, Part I, covers Conquest to Civil War. **CROSSLISTED** as ENG 386. **PREREQS:** Sophomore standing.

ART 387. A CULTURAL HISTORY OF AMERICAN ART AND LITERATURE: PART II (3). The second course an interdisciplinary sequence that examines the development and interrelationships of American art and literature from contact to the present. ART 387, Part II, covers Civil War to Harlem Renaissance. **CROSSLISTED** as ENG 387. **PREREQS:** Sophomore standing.

ART 388. A CULTURAL HISTORY OF AMERICAN ART AND LITERATURE: PART III (3). The second course an interdisciplinary sequence that examines the development and interrelationships of American art and literature from contact to the present. ART 388, Part III, covers Great Depression to Postmodernity. **CROSSLISTED** as ENG 388. **PREREQS:** Sophomore standing.

ART 391. SCULPTURE II (4). Intermediate studio course with emphasis on developing greater skills and technical knowledge in moldmaking, welding, carving, plaster or metal casting. This course is repeatable for a maximum of 12 credits. **PREREQS:** (ART 291 and (Placement Test or Placement Test) and Art core curriculum.

ART 395. SPECIAL TOPICS IN EARLY ART HISTORY (3). This course is repeatable for a maximum of 99 credits.

ART 396. SELECTED TOPICS IN MODERN ART HISTORY (3). This course is repeatable for a maximum of 99 credits.

ART 397. SELECTED TOPICS IN GLOBAL ART HISTORY (3). This course is repeatable for a maximum of 99 credits.

ART 398. SPECIAL TOPICS IN ART HISTORY (3). This course is repeatable for a maximum of 99 credits.

ART 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PREREQS: Passing fine arts portfolio or graphic arts portfolio. Open to non-Art majors.

ART 400. THE DISCERNING PEN: ART CRITICISM (3). Writing on art history provides students with an opportunity to write about art using three distinct structures and styles while drawing on the student's own ideas and opinions. **PREREQS:** (ART 101 or WR 121) and ART 200 and ART 206)

ART 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** (Placement Test or Placement Test) and Departmental approval required.

ART 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** (Placement Test or Placement Test) and Departmental approval required.

ART 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** (Placement Test or Placement Test) and Departmental approval required.

ART 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** (Placement Test or Placement Test) and Departmental approval required.

ART 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** (Placement Test or Placement Test) and Departmental approval required.

ART 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** (Placement Test or Placement Test) and ART 206 and departmental approval required.

ART 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** (Placement Test or Placement Test) and Departmental approval required.

ART 409. PRACTICUM STUDENT MEDIA (1). Practical workshop class offering experiential learning in student media on the Oregon State University campus. This course is repeatable for a maximum of 12 credits.

ART 410. INTERNSHIP (1-16). A one-quarter residency with an appropriate, approved agency or organization where a student may receive practical experience related to the objectives of the Department of Art. The intern observes and produces; the work is supervised and evaluated, both by the agency and the art faculty. This course is repeatable for a maximum of 16 credits. **PREREQS:** (Placement Test or Placement Test) and Departmental approval required.

ART 411. ^CONTEMPORARY ISSUES IN ART (3). Examination of relevant issues and realities facing working artists today through research projects, writing, gallery visits, guest lectures, videos and panel discussions. (Writing Intensive Core) **PREREQS:** Placement Test and Art core curriculum plus 12 credits of upper-division studio credits.

ART 415. ART FOR TEACHERS I (4). A studio course covering basic art materials and techniques. Integrates aesthetics and art criticism, creating art, and the cultural and historical context of works of art for K-12. May be taken in any order. **PREREQS:** Fine Arts Portfolio Review (ART1) and Graphic Design Portfolio Review (ART2)

ART 416. ART FOR TEACHERS II (4). A studio course covering basic art materials and techniques. Integrates aesthetics and art criticism, creating art, and the cultural and historical context of works of art for K-12. May be taken in any order. **PREREQS:** (Placement Test or Placement Test)

ART 418. PORTFOLIO SEMINAR (2). An advanced lecture course providing an overview of pertinent issues in creating a professional graphic design portfolio. Graded P/N. **PREREQS:** Placement Test and Junior block in graphic design.

ART 422. NEW MEDIA: INTERACTIVE (4). An advanced course designing digital experiences with emphasis on innovative navigation, architectural structures, theoretical, and historical issues of new media. **PREREQS:** Placement Test and junior block in graphic design and CS 295

ART 431. DRAWING IV (3-5). Development of an individual approach to the varied aspects of drawing, emphasis on exploration of traditional and contemporary techniques and styles. Course offered 3 to 5 credits per term. This course is repeatable for a maximum of 15 credits. **PREREQS:** (Placement Test or Placement Test) and 9 credits of ART 331.

ART 434. DRAWING IV/FIGURE (3-5). Development of an individual approach to the varied aspect of figure drawing; emphasis on exploration of traditional and contemporary techniques and styles. Course offered 3-5 credits per term; maximum 15 credits. Departmental approval required for 5 credits. This course is repeatable for a maximum of 15 credits. **PREREQS:** (Placement Test or Placement Test) and 9 credits of ART 334.

ART 441. PHOTOGRAPHY III (3-5). Using the camera as a tool to sharpen aesthetic and visual perception. This course is repeatable for a maximum of 15 credits. **PREREQS:** ((ART 341 and ART 342 and ART 343)) and (Placement Test or Placement Test) and junior or senior standing.

ART 445. PHOTO ILLUSTRATION II (3). Advanced projects in studio illustration. **PREREQS:** (Placement Test or Placement Test) and ART 346

ART 446. DOCUMENTARY PHOTOGRAPHY (3). An intensive shooting course in 35mm photography designed to develop skill in telling stories using pictures. Single picture and multiple picture stories. This course is repeatable for a maximum of 9 credits. **PREREQS:** (ART 350 and (Placement Test or Placement Test) and ART 350

ART 456. PORTFOLIO-PHOTOGRAPHY/VIDEO ART (4). Culmination-level course for the creation of an exhibition-level photographic portfolio or other artistic product using lens-based media. Taught using lectures, critiques, readings, writing and self-reflection. This course is repeatable for a maximum of 12 credits. **PREREQS:** ART 340 and ART 345 and ART 347 and junior or senior standing.

ART 460. HISTORY OF AMERICAN ART (3). Specialized study of the visual arts in the United States focusing on such issues as landscape, mass culture, and American responses to European culture. Art and ideas from the colonial period to 1900. Not offered every year. **PREREQS:** 9 credits of art history and American literature or American history.

ART 461. HISTORY OF AMERICAN ART (3). Specialized study of the visual arts in the United States focusing on such issues as landscape, mass culture, and American responses to European culture. American modernism since 1900. Not offered every year. **PREREQS:** 9 credits of art history and American literature or American history.

ART 462. DIRECTIONS AND ISSUES IN CONTEMPORARY ART (3). Specialized study of current trends, developments, and critical issues, including the study of new media such as video and photography, as they manifest themselves in the contemporary art world. May be repeated with different topics. Not offered every year. This course is repeatable for a maximum of 9 credits. **PREREQS:** 9 credits of art history or instructor approval required.

ART 463. TOPICS IN RENAISSANCE AND BAROQUE ART (3). Specialized study of selected areas of special interest, including such topics as Michelangelo, Leonardo da Vinci, Bernini, and art in the Medici's Florence. Subject matter may vary year to year. Not offered every year. This course is repeatable for a maximum of 6 credits.

PREREQS: 9 credits of art history or instructor approval required.

ART 464. CULTURAL STUDIES OF THE MUSEUM (3). Overview of the history, visual culture, and cultural significance of the Western museum. Special attention paid to the development of the art museum and artist's projects that pertain to museums. **PREREQS:** 9 credits of art history or instructor approval required.

ART 465. NATIVE AMERICAN ART (3). Northwest Coast art. Courses covering the principal media, styles, and cultural influences in Native American arts from prehistory to the present. Not offered every year. (NC)

ART 467. NATIVE AMERICAN ART (3). Plains art. Courses covering the principal media, styles, and cultural influences in Native American arts from prehistory to the present. Not offered every year. (NC)

ART 469. ^METHODS AND THEORY OF ART HISTORY (3). Seminar designed to improve writing and library skills, develop interdisciplinary approaches, and explore art historical theory from Plato to the present. **PREREQS:** 9 credits of art history or instructor approval required.

ART 475. PRINTMAKING STUDIO (3-5). Studio workshop in relief, intaglio, lithographic, and silkscreen media on an individual project basis. Course offered 3-5 credits per term; maximum 15 credits. This course is repeatable for a maximum of 15 credits. **PREREQS:** (Placement Test or Placement Test) and 9 credits of 300-level printmaking.

ART 479. PRINTMAKING: ADVANCED SCREEN PRINTING (4). Studio course in screen printing with an emphasis on photo emulsion processes. Students are encouraged to integrate these processes with other art-making methods in their creative work. This course is repeatable for a maximum of 12 credits. **PREREQS:** (ART 379 and (Placement Test or Placement Test)

ART 481. PAINTING III (3-5). Development of individual interests and directions in painting. Course offered 3-5 credits per term; maximum 15 credits. This course is repeatable for a maximum of 15 credits. **PREREQS:** (Placement Test or Placement Test) and 9 credits of 300-level painting.

ART 491. SCULPTURE III (3-5). Development of individual interests and directions in sculpture. Course offered 3-5 credits per term; maximum 15 credits. This course is repeatable for a maximum of 15 credits. **PREREQS:** (Placement Test or Placement Test) and 9 credits of 300-level sculpture.

ART 494. SPECIAL TOPICS IN EARLY ART HISTORY (3). This course is repeatable for a maximum of 99 credits.

ART 495. EXHIBITION DESIGN (1). Participatory experience in art gallery exhibition design working in Fairbanks Gallery. Includes specialized study in visual design, lighting, and technical installation. Course offered 1 credit per term, maximum 3 credits. This course is repeatable for a maximum of 3 credits. **PREREQS:** (Placement Test or Placement Test)

ART 496. SELECTED TOPICS IN MODERN ART HISTORY (3). This course is repeatable for a maximum of 99 credits.

ART 497. SELECTED TOPICS IN GLOBAL ART HISTORY (3). This course is repeatable for a maximum of 99 credits.

ART 498. SPECIAL TOPICS IN ART HISTORY (3). This course is repeatable for a maximum of 99 credits.

ART 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 99 credits. **PREREQS:** (Placement Test or Placement Test)

ART 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum

of 16 credits. **PREREQS:** Departmental approval required.

ART 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ART 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

ART 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ART 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ART 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** ART 206 and departmental approval required.

ART 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ART 510. INTERNSHIP (1-12). A one-quarter residency with an appropriate, approved agency or organization where a student may receive practical experience related to the objectives of the Department of Art. The intern observes and produces; the work is supervised and evaluated, both by the agency and the art faculty. This course is repeatable for a maximum of 15 credits. **PREREQS:** Departmental approval required.

ART 515. ART FOR TEACHERS I (4). A studio course covering basic art materials and techniques. Integrates aesthetics and art criticism, creating art, and the cultural and historical context of works of art for K-12. May be taken in any order.

ART 516. ART FOR TEACHERS II (4). A studio course covering basic art materials and techniques. Integrates aesthetics and art criticism, creating art, and the cultural and historical context of works of art for K-12. May be taken in any order.

ART 546. DOCUMENTARY PHOTOGRAPHY (3). An intensive shooting course in 35mm photography designed to develop skill in telling stories using pictures. Single picture and multiple picture stories. Lec/lab. This course is repeatable for a maximum of 9 credits. **PREREQS:** ART 350

ART 556. PORTFOLIO-PHOTOGRAPHY/VIDEO ART (4). Culmination-level course for the creation of an exhibition-level photographic portfolio or other artistic product using lens-based media. Taught using lectures, critiques, readings, writing and self-reflection. This course is repeatable for a maximum of 12 credits. **PREREQS:** junior or senior standing.

ART 562. DIRECTIONS AND ISSUES IN CONTEMPORARY ART (3). Specialized study of current trends, developments, and critical issues, including the study of new media such as video and photography, as they manifest themselves in the contemporary art world. Not offered every year. May be repeated with different topics. This course is repeatable for a maximum of 9 credits. **PREREQS:** 9 credits of art history or instructor approval required.

ART 564. CULTURAL STUDIES OF THE MUSEUM (3). Overview of the history, visual culture, and cultural significance of the Western museum. Special attention paid to the development of the art museum and artist's projects that pertain to museums. **PREREQS:** 9 credits of art history or instructor approval required.

ART 565. NATIVE AMERICAN ART (3). Northwest Coast art. Courses covering the principal media, styles, and cultural influences in Native American arts from prehistory to the present. Not offered every year. (NC)

ART 567. NATIVE AMERICAN ART (3). Plains art. Courses covering the principal media, styles, and cultural influences in Native American arts

from prehistory to the present. Not offered every year. (NC)

ART 569. METHODS AND THEORY OF ART HISTORY (3). Seminar designed to improve writing and library skills, develop interdisciplinary approaches, and explore art historical theory from Plato to the present. **PREREQS:** 9 credits of art history or instructor approval required.

ART 581. PAINTING III (3-5). Development of individual interests and directions in painting. Course offered 3 to 5 credits per term; maximum 15 credits. This course is repeatable for a maximum of 15 credits. **PREREQS:** 9 credits of 300-level painting.

ART 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 99 credits.

■ COMMUNICATION COURSES

COMM 111. *PUBLIC SPEAKING (3). Public communication as it relates to informative and persuasive discourse. The theory and practice of public speaking in informative and persuasive contexts. Lec/rec. (Bacc Core Course)

COMM 111H. *PUBLIC SPEAKING (3). Public communication as it relates to informative and persuasive discourse. The theory and practice of public speaking in informative and persuasive contexts. Lec/rec. (Bacc Core Course) **PREREQS:** Honors College approval required.

COMM 114. *ARGUMENT AND CRITICAL DISCOURSE (3). Examination of argumentation as a part of human interaction and investigation. The course emphasizes the processes by which people give reasons to gain adherence and to justify beliefs and actions. The course includes readings, writing, and presentations concerned with the nature of arguments, processes of arguing, and argument criticism. Lec/rec. (Bacc Core Course)

COMM 114H. *ARGUMENT AND CRITICAL DISCOURSE (3). Examination of argumentation as a part of human interaction and investigation. The course emphasizes the processes by which people give reasons to gain adherence and to justify beliefs and actions. The course includes readings, writing, and presentations concerned with the nature of arguments, processes of arguing, and argument criticism. Lec/rec. (Bacc Core Course) **PREREQS:** Honors College approval required.

COMM 180. INTRODUCTION TO THE RHETORIC OF THE FILM (3). The motion picture from prephotographic eras to the present; individuals responsible for major advances in theory and technique. The motion picture and social influence. Films viewed for discussion and analysis. Film fee required.

COMM 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

COMM 211X. COMMUNICATING ONLINE (3). Introduction to communicating online via an application of communication theory to online communication processes. Students will learn appropriate theory and apply theory to online communication contexts. Offered via Ecampus only.

COMM 218. *INTERPERSONAL COMMUNICATION (3). Introduction to dyadic and relational communication. Overview of current research in such areas as verbal and nonverbal messages, self-concept and perception, culture and gender stereotypes and styles, relational development and dissolution, deception, compliance gaining and conflict management. (Bacc Core Course)

COMM 218H. *INTERPERSONAL COMMUNICATION (3). Introduction to dyadic and relational communication. Overview of current research in such areas as verbal and nonverbal messages, self concept and perception, culture and gender stereotypes and styles, relational

development and dissolution, deception, compliance gaining and conflict management. (Bacc Core Course) **PREREQS:** Honors College approval required.

COMM 221. FORENSICS (3). Laboratory experience in debate, public speaking, and interpretation of literature. Preparation for intercollegiate debate and forensics participation.

COMM 280. MEDIA COMMUNICATION IN THE INFORMATION AGE (3). A survey of the traditional media of mass communication and the new and emerging media technologies: their development, role in contemporary society and impact upon the public. The influence of mediated communication upon living in the information society. (SS)

COMM 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

COMM 312. ADVANCED PUBLIC SPEAKING (3). Advanced theory and practice in public speaking. Simulated public speaking situations, audience analysis, and rhetorical strategies will be emphasized. Students will prepare and present a variety of public speeches. **PREREQS:** (COMM 111 or COMM 111H or COMM 114 or COMM 114H)

COMM 314. ARGUMENTATION (3). Concepts and processes of argumentation, systems of logic, critical analysis of contemporary efforts to influence. Examination of arguing to gain adherence and argumentation as a way of knowing. Development of cases and argument briefs for presentation. (H) **PREREQS:** (COMM 114 or COMM 114H)

COMM 316. ADVANCED PERSUASION (3). Advanced theory and practice in persuasion, with evidence on social and behavioral science research. Examination of the cognitive and affective aspects of persuasion, focusing particularly on the audience. Consideration of persuasion in interpersonal relations, organizations, public advocacy, and public relations. (H) **PREREQS:** COMM 111

COMM 318. ADVANCED INTERPERSONAL COMMUNICATION (3). Advanced theory and practice in communication in interpersonal relations. (SS) **PREREQS:** (COMM 218 or COMM 218H)

COMM 320. INTRODUCTION TO RHETORICAL THEORY (3). Introduction to the basic theories of rhetoric, as well as the background of rhetoric as a discipline in speech communication. (H)

COMM 321. INTRODUCTION TO COMMUNICATION THEORY (3). Introduction to 20th century models, theories, and empirical research programs in communication. Survey of selected theories and social scientific methods across diverse contexts in communication. (SS)

COMM 322. SMALL-GROUP PROBLEM SOLVING (3). Theory and practice of small-group decision making. Group processes of problem solving and decision by consensus. The history and role of group problem solving in a democratic society. Group power, leadership, and roles. Experience with problems of fact, value, and policy. (SS) **PREREQS:** COMM 218

COMM 323. COMMUNITY DIALOGUE (4). Examination of the nature and role of community dialogue in formal and informal social scenes in which participants communicate differing perspectives, values and beliefs. Taught at OSU-Cascades only. **PREREQS:** Sophomore standing.

COMM 324. COMMUNICATION IN ORGANIZATIONS (3). Examination of the nature and role of communication in formal and informal organizations. Introductory survey of central issues in the study of organizations, including corporate communication, leadership, organizational effectiveness, power, organizational culture, management styles, organizational conflict, and decision making. (SS)

COMM 325. COMMUNICATING LEADERSHIP (4). Theory and practice of communicating leadership. Communication processes of facilitating productive climates, innovative and creative leading, and goal-oriented community leading. Offered at OSU-Cascades only. **PREREQS:** Sophomore standing.

COMM 326. INTERCULTURAL COMMUNICATION (3). Perspectives, theories, and experiences of communication in intercultural, cross-cultural, and pan-cultural relations. (SS)

COMM 328. NONVERBAL COMMUNICATION (3). The study of human communication behavior that transcends the spoken and written word; nondiscursive symbolism. The course examines the relationship between nonverbal and verbal communication behavior and nonverbal communication skill development. Topics addressed include space, distance, the environment, touch, gesture, facial expression, and gaze as communication. (SS)

COMM 350. DEBATE AND FORENSICS WORKSHOP (1-3). Laboratory experience in debate, public speaking, and interpretation of literature. Preparation for intercollegiate debate and forensics participation. This course is repeatable for a maximum of 15 credits. **PREREQS:** Departmental approval required.

COMM 368. PROPAGANDA AND SOCIAL CONTROL (3). Case studies, examples, and analyses of direct and indirect influences upon thought, belief, and action involving mass media of communication, including film, theatre, radio, television, posters, and art objects. Historical approach using film, tape, and recordings for student analysis and discussion. (SS)

COMM 372. VISUAL RHETORIC (3). The course will survey the major theories of semiotics. Using semiotics as a foundation, students will explore the nature of the rhetoric of the visual image. (H)

COMM 380. IMAGE AND MYTH IN FILM (3). Film as a medium for creating, reflecting, and defining values, roles, styles, conflicts, problems, strategies, expectations, and institutions in American life. Various methods of analysis and evaluation are applied to film as an agent and artifact. Film images of the frontier, war, women, men, justice, America, progress, and beauty are explored. Film fee required. (H)

COMM 382. TELEMEDIA DESIGN AND PRODUCTION (4). Study and practice of communication through telemedia (video, audio, computer), and emphasis on the principles of telemedia authorship. The study includes telemedia distribution systems and effects on audiences. Lec/lab.

COMM 385. COMMUNICATION AND CULTURE IN CYBERSPACE (3). Covers history and culture of the Internet, as well as social, political, and economic issues of computer-mediated communication. (H)

COMM 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

COMM 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

COMM 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

COMM 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

COMM 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

COMM 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

COMM 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

COMM 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

COMM 410. COMMUNICATION INTERNSHIP (1-16). An assignment in a private or public business or agency. The student observes or works in one or more departments of the enterprise, perhaps in one area of interest or specialization (e.g., public relations, training, personnel, research and planning). Work is supervised by the agency staff, supervising school faculty members(s) provide academic evaluation. 12 credits maximum. This course is repeatable for a maximum of 12 credits. **PREREQS:** Major with minimum of 21 credits and school approval required.

COMM 412. TOPICS IN SPEECH COMMUNICATION (3). Contemporary issues in speech communication: appraisal and discussion of current theories, trends, research methods, problems, or applications. This course is repeatable for a maximum of 9 credits. **PREREQS:** 9 credits of speech communication.

COMM 414. COMMUNICATION RESEARCH METHODS (3). Communication research and its relationship to theory. Quantitative and qualitative methods of investigation in speech communication. Experimental and non-experimental research design; naturalistic observation; issues of reliability and validity; statistical analysis. Standards and principles of writing and reporting research. **PREREQS:** COMM 321 and /or instructor approval required.

COMM 416. ETHNOGRAPHY OF COMMUNICATION (3). Study and practice of using ethnography of communication as a research method for developing theory in communication studies; topics include data collection, analysis, and writing ethnographic reports. (SS) **PREREQS:** COMM 321

COMM 418. ^INTERPERSONAL COMMUNICATION THEORY AND RESEARCH (3). Current theory, research, and practice in interpersonal communication. Issues addressed may include compliance gaining, nonverbal behavior, family communication, gender issues, impression formation, rules, and human relations. (SS) (Writing Intensive Course) **PREREQS:** COMM 321 and /or instructor approval required.

COMM 422. ^SMALL GROUP COMMUNICATION THEORY AND RESEARCH (3). Current theory, research, and practice in communication and small group communication. Issues addressed may include leadership, decision making, problem solving, training, and human relations. (SS) (Writing Intensive Course) **PREREQS:** COMM 321 and /or instructor approval required.

COMM 425. COMMUNICATION AND YOUTH OUTREACH (4). Examines the role of communication outreach when working with youth. Study and examination of applied youth communication theory and research. Topics may include establishing communication boundaries, communicating identity, anti-smoking and anti-drug campaigns, social exclusion, effects of media, and pro-social communication. Students are required to volunteer in a youth context coordinated by the instructor. Taught only on the OSU-Cascades Campus.

COMM 426. INTERCULTURAL COMMUNICATION: THEORIES AND ISSUES (3). Advanced study in intercultural communication theoretical developments and research directions. Topics addressed may include intercultural research methods, training, language and culture, acculturation, and intercultural effectiveness. (SS) **PREREQS:** (COMM 321 and COMM 326) and /or instructor approval required.

COMM 427. CULTURAL CODES IN COMMUNICATION (3). Study and examination of the contextualized use of communication within speech communities and cultures; topics include the cultural patterning of communication and cultural communication theory.

COMM 430. THEORETICAL ISSUES IN COMMUNICATION INQUIRY (3). Review of conceptual, philosophical, ontological, epistemological, and methodological issues in the development of theories in human communication; application to contemporary, empirical human communication research. (SS) **PREREQS:** COMM 321 and /or instructor approval required.

COMM 432. GENDER AND COMMUNICATION (3). Investigation of impact of sex and gender on communication in conflict, decision-making, leadership, nonverbal messages, language, and interpersonal relationships. Focus on definitions of sex and gender in regard to knowledge, social constructs, and self-development. **PREREQS:** COMM 321 and /or instructor approval required.

COMM 440. THEORIES OF CONFLICT AND CONFLICT MANAGEMENT (3). Conflict on a variety of levels: intrapersonal, interpersonal, group, public, and social. Conflict in a variety of contexts: relationships, family, organizations, community, and society. Constructive and destructive means of confronting and managing conflict; social and psychological aspects of conflict; conflict analysis; causes of conflict; conflict and peace, social order, and social change; case studies of conflict. (SS) **PREREQS:** COMM 321 or instructor approval required.

COMM 442. BARGAINING AND NEGOTIATION PROCESSES (3). Theory and practice of bargaining and negotiation as means of settling disputes, with emphasis on the role of communication. Strategies and tactics of distributive and integrative bargaining orientations. Negotiation preparation and experience through case studies and simulations. (SS) **PREREQS:** COMM 321 or instructor approval required.

COMM 444. THIRD PARTIES IN DISPUTE RESOLUTION: MEDIATION & ARBITRATION (3). Philosophies, strategies, practices, and characteristics of mediation and arbitration processes in the settlement of conflicts and disputes. Study of the role of the third party neutral in the peace making process. Case studies and simulations in mediation and arbitration. (SS) **PREREQS:** COMM 321 or instructor approval required.

COMM 446. *COMMUNICATION IN INTERNATIONAL CONFLICT AND DISPUTES (3). Examination of the nature of international conflicts and disputes and the roles culture and communication play in resolving them constructively. Analysis of negotiation, mediation, and international law as approaches to dealing with international political, economic, cultural, and religious disputes. Scrutiny of contemporary world conflicts. (SS) (Bacc Core Course) **PREREQS:** COMM 321 or instructor approval required.

COMM 454. ADVANCED ARGUMENTATION (3). Advanced study in classical and current theories of the persuasive and epistemological functions of argumentation. Examination of the dominant contemporary theorists, including Toulmin, Perelman, and Willard. Analysis of research and applied perspectives, including conversational argument, argument fields, the philosophy of argument, argument as rhetoric, and argument in contexts. (H) **PREREQS:** COMM 320 and /or instructor approval required.

COMM 456. ^RHETORIC: 500 BC TO 500 AD (3). History and philosophy of rhetorical principles. (H) (Writing Intensive Course) **PREREQS:** COMM 320 and /or instructor approval required.

COMM 458. ^RHETORIC: 500 AD TO 1900 (3). History and philosophy of rhetorical principles. (H) (Writing Intensive Course) **PREREQS:** COMM 320 and /or instructor approval required.

COMM 459. ^CONTEMPORARY THEORIES OF RHETORIC (3). A survey of contemporary rhetorical theories from 1900 to the present. (H) (Writing Intensive Course) **PREREQS:** COMM 320 and /or instructor approval required.

COMM 460. RHETORIC OF REVOLUTIONARIES AND REACTIONARIES: 1750 TO 1900 (3). Speech criticism; great American speakers, relation of their speaking to the history of ideas; rhetoric and political, social, and religious movements. (H) **PREREQS:** COMM 320 and /or instructor approval required.

COMM 462. RHETORIC OF REVOLUTIONARIES AND REACTIONARIES: 1900-PRESENT (3). Speech criticism; great American speakers; relation of their speaking to the history of ideas; rhetoric and political, social, and religious movements. (H) **PREREQS:** COMM 320 and /or instructor approval required.

COMM 464. RHETORICAL CRITICISM (3). Explores the approaches to the criticism of rhetoric, including aesthetic, social movement, genre, feminist, and other modes of criticism. **PREREQS:** COMM 320

COMM 466. ETHICS OF RHETORIC (3). Examines the ethical questions raised by the use of persuasive discourse, including the derivation of standards of ethical persuasion and approaches to ethical judgment about persuasion. (H) **PREREQS:** COMM 320 and /or instructor approval required.

COMM 472. THE RHETORIC OF POPULAR CULTURE (3). A survey of theories of popular culture from Arnold to Hall. Students will examine various artifacts of popular culture and the influences they exert. (H)

COMM 476. ISSUES IN THE FREEDOM OF SPEECH (3). Examination of the theories of free expression and case materials related to tests of free speech in key U.S. Supreme Court cases. The course emphasizes the context of social and political movements from which the cases arise. (H) **PREREQS:** COMM 320 or instructor approval required.

COMM 478. POLITICAL CAMPAIGN RHETORIC (3). Theory, research and methods of political campaign rhetoric. Topics include rhetorical strategies and tactics in advertising, national conventions, broadcast debates, media coverage and public opinion polls. (H) **PREREQS:** COMM 320 or instructor approval required.

COMM 482. THE MEDIA IN CULTURE AND SOCIETY (3). The study of the societal-cultural impact on the media, and their effect upon individuals, social, cultural, political, economic, and leisure structures and systems. Special focus on the issues of media in shaping values, molding opinions, and reflecting/projecting attitudes, beliefs, and behaviors, including media's role in racial, gender, and familial relations. (SS) **PREREQS:** COMM 280

COMM 484. MEDIA CRITICISM (3). A critical examination of the media analysis of content, forms and deployment of media messages and products. A critical study of the structure, functions and economics of media systems. A consideration of media ethics and responsibilities in relation to news and information, entertainment, advertising and marketing, and social-cultural influence. (SS) **PREREQS:** COMM 280

COMM 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

COMM 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

COMM 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

COMM 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

COMM 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

COMM 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

COMM 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

COMM 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

COMM 510. COMMUNICATION INTERNSHIP (1-12). An assignment in a private or public business or agency. The student observes or works in one or more departments of the enterprise, perhaps in one area of interest or specialization (e.g., public relations, training, personnel, research and planning). Work is supervised by the agency staff, supervising school faculty member(s) provide academic evaluation. 12 credits maximum. Graded P/N. This course is repeatable for a maximum of 12 credits. **PREREQS:** Graduate committee approval required.

COMM 512. TOPICS IN SPEECH COMMUNICATION (3). Contemporary issues in speech communication: appraisal and discussion of current theories, trends, research methods, problems, or applications. This course is repeatable for a maximum of 9 credits. **PREREQS:** 9 credits of speech communication.

COMM 514. COMMUNICATION RESEARCH METHODS (3). Communication research and its relationship to theory. Quantitative and qualitative methods of investigation in speech communication. Experimental and non-experimental research design; naturalistic observation; issues of reliability and validity; statistical analysis. Standards and principles of writing and reporting research. **PREREQS:** COMM 321 or instructor approval required.

COMM 516. ETHNOGRAPHY OF COMMUNICATION (3). Study and practice of using ethnography of communication as a research method for developing theory in communication studies; topics include data collection, analysis, and writing ethnographic reports. **PREREQS:** COMM 321

COMM 518. INTERPERSONAL COMMUNICATION THEORY AND RESEARCH (3). Current theory, research, and practice in interpersonal communication. Issues addressed may include compliance gaining, nonverbal behavior, family communication, gender issues, impression formation, rules, and human relations. **PREREQS:** COMM 321 or instructor approval required.

COMM 520. GRADUATE SEMINAR IN COMMUNICATION (3). Introductory graduate seminar in the field of communication. Emphasis on the breadth and depth of the discipline, graduate study, and research directions.

COMM 522. SMALL GROUP COMMUNICATION THEORY AND RESEARCH (3). Current theory, research, and practice in communication and small group communication. Issues addressed may include leadership, decision making, problem solving, training, and human relations. **PREREQS:** COMM 321 or instructor approval required.

COMM 524. COMMUNICATION IN ORGANIZATIONS: THEORIES AND ISSUES (3). Analysis of human interaction within the informal and formal systems of organizations. Theory, research, and practice relevant to the analysis of the nature and role of communication within small, mid-range and highly complex organizations. The course addresses structural, functional, and cultural features of communication in organizational environments.

COMM 526. INTERCULTURAL COMMUNICATION: THEORIES AND ISSUES (3). Advanced study in intercultural communication theoretical developments and research directions. Topics addressed may include intercultural research methods, training, language and culture, acculturation, and intercultural effectiveness. **PREREQS:** COMM 321 and COMM 326 or instructor approval required.

COMM 527. CULTURAL CODES IN COMMUNICATION (3). Study and examination of the contextualized use of communication within speech communities and cultures; topics include the cultural patterning of communication and cultural communication theory.

COMM 530. THEORETICAL ISSUES IN COMMUNICATION INQUIRY (3). Review of conceptual, philosophical, ontological, epistemological, and methodological issues in the development of theories in human communication; application to contemporary, empirical human communication research. **PREREQS:** COMM 321 or instructor approval required.

COMM 532. GENDER AND COMMUNICATION (3). Investigation of impact of sex and gender on communication in conflict, decision-making, leadership, nonverbal messages, language, and interpersonal relationships. Focus on definitions of sex and gender in regard to knowledge, social constructs, and self-development. **PREREQS:** COMM 321 or instructor approval required.

COMM 540. THEORIES OF CONFLICT AND CONFLICT MANAGEMENT (3). Conflict on a variety of levels: intrapersonal, interpersonal, group, public, and social. Conflict in a variety of contexts: relationships, family, organizations, community, and society. Constructive and destructive means of confronting and managing conflict; social and psychological aspects of conflict; conflict analysis; causes of conflict; conflict and peace, social order, and social change; case studies of conflict. **PREREQS:** COMM 321 or instructor approval required.

COMM 542. BARGAINING AND NEGOTIATION PROCESSES (3). Theory and practice of bargaining and negotiation as means of settling disputes, with emphasis on the role of communication. Strategies and tactics of distributive and integrative bargaining orientations. Negotiation preparation and experience through case studies and simulations. **PREREQS:** COMM 321 or instructor approval required.

COMM 544. THIRD PARTIES IN DISPUTE RESOLUTION: MEDIATION/ARBITRATION (3). Philosophies, strategies, practices, and characteristics of mediation and arbitration processes in the settlement of conflicts and disputes. Study of the role of the third party neutral in the peace making process. Case studies and simulations in mediation and arbitration. **PREREQS:** COMM 321 or instructor approval required.

COMM 546. COMMUNICATION IN INTERNATIONAL CONFLICT AND DISPUTES (3). Examination of the nature of international conflicts and disputes and the roles culture and communication play in resolving them constructively. Analysis of negotiation, mediation, and international law as approaches to dealing with international political, economic, cultural, and religious disputes. Scrutiny of contemporary world conflicts. **PREREQS:** COMM 321 or instructor approval required.

COMM 550. COMMUNICATION AND THE PRACTICE OF SCIENCE (3). Communication is central to science-based decision-making, the function of science teams, the reporting and critique of scientific knowledge, and the interface between science and policy making. This seminar emphasizes communication competence in the arena of applied science; that is, science as practiced in government agencies, private corporations, and nonprofit organizations.

COMM 554. ADVANCED ARGUMENTATION (3). Advanced study in classical and current theories of the persuasive and epistemological functions of argumentation. Examination of the dominant contemporary theorists, including Toulmin, Perelman, and Willard. Analysis of research and applied perspectives, including conversational argument, argument fields, the philosophy of argument, argument as rhetoric, and argument in contexts. **PREREQS:** COMM 320 or instructor approval required.

COMM 556. RHETORIC: 500 BC TO 500 AD (3). History and philosophy of rhetorical principles. **PREREQS:** COMM 320 or instructor approval required.

COMM 558. RHETORIC: 500 AD TO 1900 (3). History and philosophy of rhetorical principles. **PREREQS:** COMM 320 or instructor approval required.

COMM 559. CONTEMPORARY THEORIES OF RHETORIC (3). A survey of contemporary rhetorical theories from 1900 to the present. **PREREQS:** COMM 320 or instructor approval required.

COMM 560. RHETORIC OF REVOLUTIONARIES AND REACTIONARIES: 1750 TO 1900 (3). Speech criticism; great American speakers, relation of their speaking to the history of ideas; rhetoric and political, social, and religious movements. **PREREQS:** COMM 320 or instructor approval required.

COMM 562. RHETORIC OF REVOLUTIONARIES AND REACTIONARIES: 1900-PRESENT (3). Speech criticism; great American speakers; relation of their speaking to the history of ideas; rhetoric and political, social, and religious movements. **PREREQS:** COMM 320 or instructor approval required.

COMM 564. RHETORICAL CRITICISM (3). Explores the approaches to the criticism of rhetoric, including aesthetic, social movement, genre, feminist, and other modes of criticism. **PREREQS:** COMM 320 or instructor approval required.

COMM 566. ETHICS OF RHETORIC (3). Examines the ethical questions raised by the use of persuasive discourse, including the derivation of standards of ethical persuasion and approaches to ethical judgment about persuasion. **PREREQS:** COMM 320 or instructor approval required.

COMM 572. THE RHETORIC OF POPULAR CULTURE (3). A survey of theories of popular culture from Arnold to Hall. Students will examine various artifacts of popular culture popular culture and the influences they exert.

COMM 576. ISSUES IN THE FREEDOM OF SPEECH (3). Examination of the theories of free expression and case materials related to tests of free speech in key U.S. Supreme Court cases. The course emphasizes the context of social and political movements from which the cases arise. **PREREQS:** COMM 320 or instructor approval required.

COMM 578. POLITICAL CAMPAIGN RHETORIC (3). Theory, research and methods of political campaign rhetoric. Topics include rhetorical strategies and tactics in advertising, national conventions, broadcast debates, media coverage and public opinion polls. **PREREQS:** COMM 320 or instructor approval required.

COMM 582. THE MEDIA IN CULTURE AND SOCIETY (3). The study of the societal-cultural impact on the media, and their effect upon individuals, social, cultural, political, economic, and leisure structures and systems. Special focus on the issues of media in shaping values, molding opinions, and reflecting/projecting attitudes, beliefs, and behaviors, including media's role in racial, gender, and familial relations. **PREREQS:** COMM 280

COMM 584. MEDIA CRITICISM (3). A critical examination of the media analysis of content, forms and deployment of media messages and products. A critical study of the structure, functions and economics of media systems. A consideration of media ethics and responsibilities in relation to news and information, entertainment, advertising and marketing, and social-cultural influence. **PREREQS:** COMM 280

COMM 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

COMM 808. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

■ MUSIC EDUCATION COURSES

MUED 277. INSTRUMENTAL TECHNIQUES (1). MUED 277: High Brass; MUED 277: Low Brass; MUED 277: Single Reeds/Flute; MUED 277: Double Reeds/Flute; MUED 277: High Strings; MUED 277: Low Strings; MUED 277: Percussion. Basic instruction for each instrumental family. Emphasis is on techniques for teaching each group of instruments. Includes a survey and evaluation of instrumental methods texts. Emphasis on pedagogical skills as they relate to a beginning instrumentalist rather than upon performance skills. This course is repeatable for a maximum of 7 credits.

MUED 353. MUSIC EDUCATION IN PUBLIC SCHOOLS (3). Examines historical practices, philosophical differences, and pedagogical approaches that influence public school music programs. Field experiences provide contextual models with genuine teaching opportunities each week. **PREREQS:** MUS 121

MUED 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUED 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUED 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUED 406. PROJECT (1). Editing and refining of portfolio materials representing professional growth in teaching throughout the Professional Teacher and Counselor Education Program. Includes work samples, assessments, reflections, and videotapes. This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUED 408. WORKSHOP (1-16). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUED 413. THEORY AND PRACTICUM: FIELD (1-4). Field experience in music classroom. For pre-MAT students taking 4 credits, the experience is approximately 10 hours per week in elementary-level classroom.

MUED 460. PSYCHOLOGY OF MUSIC (3). The study and evaluation of psychological, physiological, and neurological aspects of musical behavior and experience; including but not limited to acoustics, human hearing, perception and cognition, development and expertise, affective response and preference, unusual abilities, and selected special topics. **PREREQS:** Junior standing and instructor approval.

MUED 470. METHODS AND MATERIALS FOR THE PUBLIC SCHOOL WIND BAND (3). Includes examination of method books, instructional materials, and music for middle school and high school band. Class format is lecture, discussions, and microteaching demonstrations. Includes study of past and current methods of improving student musical understanding and performance through band literature and rehearsal techniques. **PREREQS:** MUS 318 and MUS 319 (Instrumental

conducting). Must have senior standing as a music education major.

MUED 471. FUNDAMENTALS OF MUSIC FOR ELEMENTARY CLASSROOM TEACHERS (3). Music activities for elementary teachers in training. Introductory course designed to build musicianship through experiences that are developmentally appropriate to the teaching of music in the primary elementary classroom.

MUED 473. METHODS FOR TEACHING ELEMENTARY MUSIC (3). Focuses on pedagogical content knowledge in music for specialists preparing to teach Kindergarten through grade five. Students will focus on the developmental characteristics of learners, multiple representations of the subject matter, and lesson planning incorporating state and national standards. Issues related to diverse and special needs populations will be interwoven throughout each segment of the course. **PREREQS:** MUED 353 and Admission to the Professional Music Teacher Education program or permission of instructor.

MUED 477. CLASSROOM INSTRUMENTAL TECHNIQUES (2). A brief overview of fundamental principles and playing techniques of brass, percussion, string, and woodwind instruments designed for the choral music educator who uses instrumental accompaniment or conducts an instrumental ensemble. **PREREQS:** MUS 222 and MUS 234 and MUS 319

MUED 478. TECHNIQUES FOR THE VOCAL INSTRUCTOR (2). Vocal techniques for the public school music teacher. Offered alternate years. **PREREQS:** MUS 185 or instructor approval required.

MUED 499. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUED 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUED 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUED 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

MUED 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUED 506. PROJECTS (1-16). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUED 507. THEORY AND PRACTICUM SEMINAR (1-4). Field experience in music classroom. This course is repeatable for a maximum of 10 credits. **PREREQS:** Departmental approval required.

MUED 508. WORKSHOP (1-16). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUED 510. PROFESSIONAL INTERNSHIP (3-15). A supervised teaching experience at a variety of public school levels. The student works with an experienced mentor teacher, accepting the professional responsibilities of teaching. This course is repeatable for a maximum of 15 credits. **PREREQS:** Departmental approval required.

MUED 521. SPECIAL TOPICS IN MUSIC EDUCATION (3). Advanced pedagogy in one particular area within music education, such as jazz band techniques, computer design of marching band drills, advanced technology in music education. Topics will vary. **PREREQS:** Departmental approval required.

MUED 560. PSYCHOLOGY OF MUSIC (3). The study and evaluation of psychological,

physiological, and neurological aspects of musical behavior and experience; including but not limited to acoustics, human hearing, perception and cognition, development and expertise, affective response and preference, unusual abilities, and selected special topics. **PREREQS:** Junior standing and instructor approval.

MUED 562. RESEARCH IN MUSIC EDUCATION (3). Introduction to the historical, philosophical, quantitative and qualitative research methodologies in music education. Includes interpretation and application of findings published in major research journals. **PREREQS:** Admission to the Professional Teacher and Counselor Licensure program or instructor approval required.

MUED 570. METHODS AND MATERIALS FOR THE PUBLIC SCHOOL WIND BAND (3). Includes examination of method books, instructional materials, and music for middle school and high school band. Class format is lecture, discussions, and microteaching demonstrations. Includes study of past and current methods of improving student musical understanding and performance through band literature and rehearsal techniques. **PREREQS:** Designed for vocal students enrolled in the Professional Music Teacher Education Program. Departmental approval required.

MUED 573. METHODS FOR TEACHING ELEMENTARY MUSIC (3). Focuses on pedagogical content knowledge in music for specialists preparing to teach Kindergarten through grade five. Students will focus on the developmental characteristics of learners, multiple representations of the subject matter, and lesson planning incorporating state and national standards. Issues related to diverse and special needs populations will be interwoven throughout each segment of the course. **PREREQS:** Admission to the Professional Music Teacher Education program or permission of instructor. MUED 353

MUED 574. MIDDLE LEVEL MUSIC EDUCATION (3). This methods course focuses on general music education, grades four through eight. Students explore relationships between teaching and learning in order to effectively plan for instruction. **PREREQS:** Departmental approval required.

MUED 580. SECONDARY VOCAL MUSIC EDUCATION (3). This methods course focuses on vocal music education, grades nine through twelve. Students explore relationships between teaching and learning in order to effectively plan for instruction. **PREREQS:** Departmental approval required.

MUED 581. SECONDARY INSTRUMENTAL MUSIC EDUCATION (3). This methods course focuses on instrumental music education, grades nine through twelve. Students explore relationships between teaching and learning in order to effectively plan for instruction. **PREREQS:** Departmental approval required.

MUED 591. CURRICULUM FOUNDATIONS IN MUSIC EDUCATION (3). Examination of historical, philosophical, and social influences on contemporary music education emphasizing 1950 through the present, culminating in the National Standards for Arts Education. **PREREQS:** Departmental approval required.

MUED 592. CURRICULUM IMPLEMENTATION AND EVALUATION (3). Students design and construct a comprehensive music education curriculum grounded in current research, the National Standards for Arts Education and Oregon's Common Curriculum Goals. **PREREQS:** Departmental approval required.

MUED 593. MUSIC TECHNOLOGY (3). Specific applications for teaching music incorporating appropriate software and hardware for curricular integration and curricular evolution.

MUED 599. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

■ MUSIC (STUDIO) COURSES

MUP 160. INDIVIDUAL LESSONS: BEGINNING PIANO (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 161. INDIVIDUAL LESSONS: BEGINNING STRINGS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 162. INDIVIDUAL LESSONS: BEGINNING BRASS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 163. INDIVIDUAL LESSONS: BEGINNING WOODWINDS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 164. INDIVIDUAL LESSONS: BEGINNING VOICE (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 165. INDIVIDUAL LESSONS: BEGINNING PERCUSSION (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 170. INDIVIDUAL LESSONS: INTERMEDIATE PIANO (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 171. INDIVIDUAL LESSONS: INTERMEDIATE STRINGS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 172. INDIVIDUAL LESSONS: INTERMEDIATE BRASS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 173. INDIVIDUAL LESSONS: INTERMEDIATE WOODWINDS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 174. INDIVIDUAL LESSONS: INTERMEDIATE VOICE (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required. Simultaneous participation in one OSU choir is required.

MUP 175. INDIVIDUAL LESSONS: INTERMEDIATE PERCUSSION (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 190. INDIVIDUAL LESSONS: KEYBOARD (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 191. INDIVIDUAL LESSONS: VOICE (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 192. INDIVIDUAL LESSONS: STRINGS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 193. INDIVIDUAL LESSONS: WOODWINDS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 194. INDIVIDUAL LESSONS: BRASS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 195. INDIVIDUAL LESSONS: PERCUSSION (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 290. INDIVIDUAL LESSONS: KEYBOARD (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 291. INDIVIDUAL LESSONS: VOICE (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 292. INDIVIDUAL LESSONS: STRINGS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 293. INDIVIDUAL LESSONS: WOODWINDS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 294. INDIVIDUAL LESSONS: BRASS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 295. INDIVIDUAL LESSONS: PERCUSSION (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 390. INDIVIDUAL LESSONS: KEYBOARD (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 391. INDIVIDUAL LESSONS: VOICE (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required. Simultaneous participation in one OSU choir ensemble is required.

MUP 392. INDIVIDUAL LESSONS: STRINGS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 393. INDIVIDUAL LESSONS: WOODWINDS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 394. INDIVIDUAL LESSONS: BRASS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 395. INDIVIDUAL LESSONS: PERCUSSION (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 490. INDIVIDUAL LESSONS: KEYBOARD (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 491. INDIVIDUAL LESSONS: VOICE (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required. Simultaneous participation in one OSU choir ensemble is required.

MUP 492. INDIVIDUAL LESSONS: STRINGS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 493. INDIVIDUAL LESSONS: WOODWINDS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 494. INDIVIDUAL LESSONS: BRASS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 495. INDIVIDUAL LESSONS: PERCUSSION (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 590. INDIVIDUAL LESSONS: KEYBOARD (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 591. INDIVIDUAL LESSONS: VOICE (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 592. INDIVIDUAL LESSONS: STRINGS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 594. INDIVIDUAL LESSONS: BRASS (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

MUP 595. INDIVIDUAL LESSONS: PERCUSSION (1-2). This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

■ MUSIC COURSES

MUS 101. *MUSIC APPRECIATION I: SURVEY (3). Dealing primarily with the Western classical tradition, the course focuses on developing perceptive listening skills through the study of musical forms and styles. For non-majors. (FA) (Bacc Core Course)

MUS 101H. *MUSIC APPRECIATION I: SURVEY (3). Dealing primarily with the Western classical tradition, the course focuses on developing perceptive listening skills through the study of musical forms and styles. For non-majors. (FA) (Bacc Core Course) **PREREQS:** Honors College approval required.

MUS 102. *MUSIC APPRECIATION II: PERIODS AND GENRES (3). A study of the masterworks of a single era (such as Baroque, classic, romantic, twentieth century) or a genre (such as orchestra, chamber, opera, musical theatre). See Schedule of Classes for topic being offered. For non-majors. Need not be taken in order. (FA) (Bacc Core Course) This course is repeatable for a maximum of 12 credits.

MUS 102H. *MUSIC APPRECIATION II: PERIODS AND GENRES (3). A study of the masterworks of a single era (such as Baroque, classic, romantic, twentieth century) or a genre (such as orchestra, chamber, opera, musical theatre). See Schedule of Classes for topic being offered. For non-majors. Need not be taken in order. (FA) (Bacc Core Course) This course is repeatable for a maximum of 12 credits. **PREREQS:** Honors College approval required.

MUS 103. *MUSIC APPRECIATION III: GREAT COMPOSERS (3). The life and works of one or more significant composers including Bach, Haydn, Mozart, Beethoven, and others. (See Schedule of Classes for composers being offered.) For non-majors. Does not need to be taken in sequence. (FA) (Bacc Core Course) This course is repeatable for a maximum of 18 credits.

MUS 103H. *MUSIC APPRECIATION III: GREAT COMPOSERS (3). The life and works of one or more significant composers including Bach, Haydn, Mozart, Beethoven, and others. (See Schedule of Classes for composers being offered.) For non-majors. Does not need to be taken in sequence. (FA) (Bacc Core Course) This course is repeatable for a maximum of 18 credits. **PREREQS:** Honors College approval required.

MUS 104. SURVEY OF JAZZ (3). Explores the historical, sociological and artistic development of jazz, America's musical art form. A concise review of the first 100 years of the music from its blues-based roots at the turn of the 20th century to its current eclectic state will constitute the main framework of the course. While the focus will be on the important performers and composers of jazz, key historical and social events that contributed to the evolution of the idiom will also be discussed.

MUS 108. *MUSIC CULTURES OF THE WORLD (3). Survey of the world's music with attention to musical styles and cultural contexts. Included are Oceania, Indonesia, Africa, Asia, Latin America. (See Schedule of Classes for subject being offered.) For non-majors. (NC) (Bacc Core Course) This course is repeatable for a maximum of 18 credits.

MUS 108H. *MUSIC CULTURES OF THE WORLD (3). Survey of the world's music with attention to musical styles and cultural contexts. Included are Oceania, Indonesia, Africa, Asia, Latin America. (See Schedule of Classes for subject being offered.) For non-majors. (NC) (Bacc Core Course) This course is repeatable for a maximum of 18 credits. **PREREQS:** Honors College approval required.

MUS 121. LITERATURE AND MATERIALS OF MUSIC I (3). Covers fundamentals of music theory along with a brief introduction to Western art music. This requires students to learn to read and write all notes in treble and bass clef, and all common scales, intervals, triads and seventh chords, using key signatures. They also learn to recognize basic rhythms and write them down. This course is repeatable for a maximum of 6 credits. **PREREQS:** A grade of 80% on the final exam is required to move on to MUS 122.

MUS 122. LITERATURE AND MATERIALS OF MUSIC I (3). An integrated, team-taught approach to the study of Western art music, including repertory, melodic, harmonic, and rhythmic components, formal organization, and composition. Recitation included. **PREREQS:** Placement exam and MUS 121

MUS 123. LITERATURE AND MATERIALS OF MUSIC I (3). An integrated, team-taught approach to the study of Western art music, including repertory, melodic, harmonic, and rhythmic components, formal organization, and composition. Recitation included. Lec/lab/rec. **PREREQS:** Placement exam and MUS 122

MUS 125. LITERATURE AND MATERIALS LAB I (1). Scales, all major and harmonic form of minor, interval drill. **PREREQS:** MUS 121. Music majors must take concurrently with MUS 122.

MUS 126. LITERATURE AND MATERIALS LAB II (1). Transpose scores, harmonic idioms, harmonic progressions. Lec/lab. **PREREQS:** MUS 122 and MUS 125. Music majors must take course concurrently with MUS 123.

MUS 135. AURAL SKILLS II (1). Aural comprehension of the basic melodic, rhythmic, and harmonic elements of music. **PREREQS:** Students should take concurrently with MUS 122.

MUS 136. AURAL SKILLS I (1). Aural comprehension of the basic melodic, rhythmic, and harmonic elements of music. **PREREQS:** MUS 135. Students must take concurrently with MUS 123.

MUS 137. JAZZ IMPROVISATION (1-3). Instrumental and vocal improvisation including composition and arranging techniques. This course is repeatable for a maximum of 9 credits. **PREREQS:** Departmental approval required.

MUS 140. OSU CHAMBER CHOIR (1-2). A select ensemble of approximately 40 mixed voices. Performances each term. Annual tours. (FA) This course is repeatable for a maximum of 9 credits. **PREREQS:** Departmental approval required.

MUS 146. WOMEN'S CHOIR (1-2). A women's ensemble designed for vocal development and exploration of treble choral literature. Performances each term. This course is repeatable for a maximum of 9 credits. **PREREQS:** Departmental approval required.

MUS 147. MEN'S CHOIR (1-2). A men's ensemble designed for vocal development and exploration of TTBB choral literature. Performances each term. This course is repeatable for a maximum of 9 credits.

MUS 150. SYMPHONIC BAND (1). A select ensemble of approximately 80 wind and percussion players. Performance each term. (FA) This course is repeatable for a maximum of 9 credits.

MUS 151. CONCERT BAND (1). Wind and percussion ensemble of approximately 70 players. Performance each term. Open to all students. This course is repeatable for a maximum of 9 credits.

MUS 152. RHYTHM AND BEAVS PEP BAND (1). An auditioned group of 12 musicians who perform at university, community, and athletic events throughout the year. This course is repeatable for a maximum of 9 credits. **PREREQS:** Departmental approval required.

MUS 153. MARCHING BAND (1-2). A marching and playing unit of more than 160 musicians. Performs for home football games. This course is repeatable for a maximum of 6 credits.

MUS 154. BASKETBALL BAND (1). An ensemble of approximately 50 players. Performs for home games. This course is repeatable for a maximum of 3 credits.

MUS 155. COLOR GUARD (1). A derivative of the Marching Band Color Guard, this ensemble performs and competes around the Pacific Northwest during winter term. Audition required. This course is repeatable for a maximum of 9 credits. **PREREQS:** Departmental approval required.

MUS 156. INDOOR DRUM LINE (1-2). A derivative of the Marching Band Drum Line, this ensemble performs and competes around the Pacific Northwest during winter term. Audition required. This course is repeatable for a maximum of 9 credits. **PREREQS:** Departmental approval required.

MUS 157. SMALL JAZZ ENSEMBLE (1). Concentration on current jazz styles. Performance each term. This course is repeatable for a maximum of 9 credits. **PREREQS:** Departmental approval required.

MUS 158. LARGE JAZZ ENSEMBLE (1). Concentration on current jazz styles. Performance each term. This course is repeatable for a maximum of 9 credits. **PREREQS:** Departmental approval required.

MUS 160. UNIVERSITY SYMPHONY ORCHESTRA (1). An ensemble of 65-80 players. Performance of orchestral repertoire from the eighteenth, nineteenth, and twentieth centuries. Performance each term. (FA) This course is repeatable for a maximum of 9 credits. **PREREQS:** Departmental approval required.

MUS 163. ACCOMPANYING (1). Piano accompanying and chamber music skills, studio experience and weekly performance class. This course is repeatable for a maximum of 9 credits. **PREREQS:** Departmental approval required. Must enroll concurrently in MUS 190 or MUS 290.

MUS 164. CHAMBER ENSEMBLE: STRINGS (1). This course is repeatable for a maximum of 9 credits. **PREREQS:** Departmental approval required.

MUS 165. CHAMBER ENSEMBLE: WOODWINDS (1). This course is repeatable for a maximum of 9 credits. **PREREQS:** Departmental approval required.

MUS 166. CHAMBER ENSEMBLE: BRASS (1). This course is repeatable for a maximum of 9 credits. **PREREQS:** Departmental approval required.

MUS 167. CHAMBER ENSEMBLE: PERCUSSION (1). This course is repeatable for a maximum of 9 credits. **PREREQS:** Departmental approval required.

MUS 168. CHAMBER ENSEMBLE: MISCELLANEOUS (1). This course is repeatable for a maximum of 9 credits. **PREREQS:** Departmental approval required.

MUS 169. OPERA WORKSHOP (1-2). See Schedule of Classes for term offered. This course is repeatable for a maximum of 3 credits. **PREREQS:** Departmental approval required.

MUS 177. GROUP LESSONS: PIANO (1). Beginning Piano I, elementary group instruction in piano skills for non-majors. This course is repeatable for a maximum of 2 credits.

MUS 178. GROUP LESSONS: PIANO (1). Beginning Piano II: Continuation of MUS 177, piano for non-majors. This course is repeatable for a maximum of 2 credits. **PREREQS:** Departmental approval required.

MUS 179. GROUP LESSONS: PIANO (1). Beginning Piano III. Continuation of MUS 177, MUS 178. Piano for non-majors. This course is repeatable for a maximum of 2 credits. **PREREQS:** Departmental approval required.

MUS 180. GROUP LESSONS: PIANO (1). (Basic Levels - A, B, C). Elementary group instruction in piano skills and basic theory. This course is repeatable for a maximum of 9 credits. **PREREQS:** Departmental approval required.

MUS 181. GROUP LESSONS: PIANO (1). (Intermediate Level I). Group instruction in piano skills. See Schedule of Classes for section offered. This course is repeatable for a maximum of 9 credits. **PREREQS:** MUS 101 and instructor and departmental approval required.

MUS 182. GROUP LESSONS: PIANO (1). (Intermediate Level II). Group instruction in piano skills. (See Schedule of Classes for section offered.) This course is repeatable for a maximum of 9 credits. **PREREQS:** Departmental approval required.

MUS 183. GROUP LESSONS: PIANO (1). (Intermediate Level III.) Group instruction in piano skills. See Schedule of Classes for section offered. This course is repeatable for a maximum of 3 credits. **PREREQS:** Departmental approval required.

MUS 185. VOICE CLASS (1). Students improve and strengthen the voice as a solo instrument. This course is repeatable for a maximum of 9 credits.

MUS 186. GROUP GUITAR (1). Teaches fundamentals of the guitar in a small-group setting. Emphasis on practical use of the instrument. This course is repeatable for a maximum of 9 credits.

MUS 187. GROUP GUITAR II (1). A continuation of MUS 186, MUS 187 focuses on helping students learn higher functionality in techniques and attain greater ability to perform solo or in ensemble. This course is repeatable for a maximum of 9 credits. **PREREQS:** MUS 186

MUS 199. SPECIAL STUDIES (1-3). First-year level. This course is repeatable for a maximum of 18 credits.

MUS 221. LITERATURE AND MATERIALS OF MUSIC (3). Advanced harmony, techniques of analysis, musical form, composition. Continued study of the repertory of Western music through the mid-twentieth century. **PREREQS:** MUS 123 or departmental approval required. MUS 221, MUS 222, MUS 223 must be taken in sequence.

MUS 222. LITERATURE AND MATERIALS OF MUSIC (3). Advanced harmony, techniques of analysis, musical form, composition. Continued study of the repertory of Western music through the mid-twentieth century. Three lectures weekly. **PREREQS:** MUS 221 or departmental approval required. MUS 221, MUS 222, MUS 223 must be taken in sequence.

MUS 223. LITERATURE AND MATERIALS OF MUSIC (3). Advanced harmony, techniques of analysis, musical form, composition. Continued study of the repertory of Western music through the mid-twentieth century. Three lectures weekly. **PREREQS:** MUS 222 or departmental approval required. MUS 221, MUS 222, MUS 223 must be taken in sequence.

MUS 234. AURAL SKILLS II (1). Sight-singing; melodic and harmonic dictation. To be taken in sequence. **PREREQS:** MUS 123 and MUS 136 or departmental approval required.

MUS 235. AURAL SKILLS II (1). Sight-singing; melodic and harmonic dictation. To be taken in sequence. **PREREQS:** MUS 234 or departmental approval required.

MUS 236. AURAL SKILLS II (1). Sight-singing; melodic and harmonic dictation. To be taken in sequence. **PREREQS:** MUS 235 or departmental approval required.

MUS 299. SPECIAL STUDIES (1-3). Sophomore level. This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUS 315. INTRODUCTION TO CONDUCTING (2). Basic terminology, beat patterns, and baton technique. Introduction to score preparation. Philosophy and history of conducting are also addressed. **PREREQS:** MUS 223 and MUS 236 and piano proficiency exam.

MUS 316. CHORAL CONDUCTING (2). Continuation of MUS 315. Hand gesture technique, score reading, and score preparation of literature from all major historical periods. Focus upon principles of developing choral excellence. Includes conducting practice with a campus ensemble. To be taken in sequence. **PREREQS:** MUS 315

MUS 317. CHORAL CONDUCTING (2). Continuation of MUS 315. Hand gesture technique, score reading, and score preparation of literature from all major historical periods. Focus upon principles of developing choral excellence. To be taken in sequence. **PREREQS:** MUS 315

MUS 318. INSTRUMENTAL CONDUCTING (2). Continuation of MUS 315, including types of instrumental groups, seating arrangements, score preparation, and instrumental transposition and ranges. Advanced baton technique. To be taken in sequence. **PREREQS:** MUS 315

MUS 319. INSTRUMENTAL CONDUCTING (2). Continuation of MUS 315, including types of instrumental groups, seating arrangements, score preparation, and instrumental transposition and ranges. Advanced baton technique. To be taken in sequence. **PREREQS:** MUS 315

MUS 321. LITERATURE AND MATERIALS OF MUSIC III (3). Twentieth century harmony and counterpoint, including contrapuntal composition. Continued study and analysis of repertoire into the 21st century. **PREREQS:** MUS 223 or departmental approval.

MUS 324. HISTORY OF WESTERN MUSIC (3). Chronological survey of the Euro-American traditions in music to be taken in sequence. **PREREQS:** MUS 123 and MUS 223 recommended.

MUS 325. HISTORY OF WESTERN MUSIC (3). Traces the development of music history from the early Classic period through the end of the 19th century. Major trends in orchestral, solo, chamber and vocal music are explored through lectures, readings, research, discussion, score studies, and intensive writing assignments. (Writing Intensive Course) **PREREQS:** MUS 123 and MUS 223 recommended.

MUS 326. HISTORY OF WESTERN MUSIC (3). Chronological survey of the Euro-American traditions in music to be taken in sequence. **PREREQS:** MUS 123 and MUS 223 recommended.

MUS 337. JAZZ IMPROVISATION (1-3). Instrumental and vocal improvisation including composition and arranging techniques. This course is repeatable for a maximum of 9 credits. **PREREQS:** Two years college-level MUS 137 experience or equivalent. Departmental approval required.

MUS 340. OSU CHAMBER CHOIR (1-2). A select ensemble of approximately 40 mixed voices. Performance each term. Annual tours. Students must have two years college-level vocal experience or equivalent. (FA) This course

is repeatable for a maximum of 9 credits. **PREREQS:** Departmental approval required.

MUS 346. WOMEN'S CHOIR (1-2). A women's ensemble designed for vocal development and exploration of treble choral literature. Performances each term. This course is repeatable for a maximum of 9 credits. **PREREQS:** Students must have two years of college-level choral singing or equivalent.

MUS 347. MEN'S CHOIR (1-2). A men's ensemble designed for vocal development and exploration of TTBB choral literature. Performances each term. This course is repeatable for a maximum of 9 credits. **PREREQS:** Students must have two years of college-level choral singing or equivalent.

MUS 350. SYMPHONIC BAND (1). A select ensemble of approximately 80 wind and percussion players. Performance winter and spring terms. (FA) This course is repeatable for a maximum of 9 credits. **PREREQS:** Students must have two years college-level band experience or equivalent.

MUS 351. CONCERT BAND (1). Wind and percussion ensemble of approximately 70 players. Performance each term. Open to all students. This course is repeatable for a maximum of 9 credits. **PREREQS:** Students must have two years college-level band experience or equivalent.

MUS 352. RHYTHM AND BEATS PEP BAND (1). An auditioned group of 12 musicians who perform at university, community, and athletic events throughout the year. This course is repeatable for a maximum of 9 credits. **PREREQS:** Students must have two years of college-level band experience or equivalent. Departmental approval required.

MUS 353. MARCHING BAND (1-2). A marching and playing unit of more than 160 musicians. Performs for home football games; one trip each year to an off-campus game. This course is repeatable for a maximum of 6 credits. **PREREQS:** Students must have two years of college-level band experience or equivalent.

MUS 354. BASKETBALL BAND (1). An ensemble of approximately 50 players. Performs for home games. Students must have two years college-level experience. This course is repeatable for a maximum of 3 credits. **PREREQS:** Students must have two years of college-level band experience or equivalent.

MUS 355. COLOR GUARD (1). A derivative of the Marching Band Color Guard, this ensemble performs and competes around the Pacific Northwest during winter term. Audition required. This course is repeatable for a maximum of 3 credits. **PREREQS:** Students must have two years of college-level color guard experience or equivalent. Departmental approval required.

MUS 356. INDOOR DRUM LINE (1-2). A derivative of the Marching Band Drum Line, this ensemble performs and competes around the Pacific Northwest during winter term. Audition required. This course is repeatable for a maximum of 3 credits. **PREREQS:** Departmental approval required.

MUS 357. SMALL JAZZ ENSEMBLE (1). Concentration on current jazz styles. Performance each term. This course is repeatable for a maximum of 9 credits. **PREREQS:** Students must have two years college-level jazz band experience or equivalent. Departmental approval required.

MUS 358. LARGE JAZZ ENSEMBLE (1). Concentration on current jazz styles. Performance each term. This course is repeatable for a maximum of 9 credits. **PREREQS:** Students must have two years college-level jazz band experience or equivalent. Departmental approval required.

MUS 360. UNIVERSITY SYMPHONY ORCHESTRA (1). An ensemble of 65-80 players. Performance of orchestral repertoire from the 18th, 19th, and 20th centuries. Performance each term. (FA) This course is repeatable for a

maximum of 9 credits. **PREREQS:** Students must have two years college-level orchestra experience or equivalent. Departmental approval required.

MUS 363. ACCOMPANYING (1). Piano accompanying and chamber music skills, studio experience, and weekly performance class. This course is repeatable for a maximum of 9 credits. **PREREQS:** Students must have two years college-level ensemble or equivalent. Departmental approval required. Students must simultaneously take MUS 390 or MUS 490.

MUS 364. CHAMBER ENSEMBLE: STRINGS (1). This course is repeatable for a maximum of 9 credits. **PREREQS:** Students must have two years college-level ensemble experience or equivalent. Departmental approval required.

MUS 365. CHAMBER ENSEMBLE: WOODWINDS (1). This course is repeatable for a maximum of 9 credits. **PREREQS:** Students must have two years college-level ensemble experience or equivalent. Departmental approval required.

MUS 366. CHAMBER ENSEMBLE: BRASS (1). This course is repeatable for a maximum of 9 credits. **PREREQS:** Students must have two years college-level ensemble experience or equivalent. Departmental approval required.

MUS 367. CHAMBER ENSEMBLE: PERCUSSION (1). This course is repeatable for a maximum of 9 credits. **PREREQS:** Students must have two years college-level ensemble experience or equivalent. Departmental approval required.

MUS 368. CHAMBER ENSEMBLE: MISCELLANEOUS (1). This course is repeatable for a maximum of 9 credits. **PREREQS:** Students must have two years college-level ensemble experience or equivalent. Departmental approval required.

MUS 369. OPERA WORKSHOP (1-2). See Schedule of Classes for term offered. This course is repeatable for a maximum of 3 credits. **PREREQS:** Students must have two years college-level vocal performance experience or equivalent. Departmental approval required.

MUS 399. SPECIAL STUDIES (1-3). Junior level. This course is repeatable for a maximum of 18 credits.

MUS 401. RESEARCH AND SCHOLARSHIP (1-6). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUS 402. INDEPENDENT STUDY (1-6). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUS 403. THESIS (1-6). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUS 405. READING AND CONFERENCE (1-6). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUS 406. PROJECTS (1-6). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUS 407. SEMINAR (1-6). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUS 408. WORKSHOP (1-6). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUS 410. INTERNSHIP (3). Provides experience in field settings, opportunity to develop personal and professional skills. See school for details. This course is repeatable for a maximum of 12 credits. **PREREQS:** School approval required.

MUS 442. GENRE STUDIES (3). Intensive study of selected genres, such as orchestra, chamber music, keyboard literature, vocal literature, music theatre and opera. See Schedule of Classes for topic. This course is repeatable for a maximum of 18 credits.

MUS 443. THEORY AND COMPOSITION STUDIES (3). Intensive study of selected subjects, such as analysis, composition, choral arranging, band arranging, and orchestration. See Schedule of Classes for topic. This course is repeatable for a maximum of 18 credits. **PREREQS:** MUS 223

MUS 472. ITALIAN AND LATIN DICTION FOR SINGERS (2). Presents the principles of lyric diction in Italian and liturgical Latin and provides practice in the skills needed to sing the languages accurately and expressively.

MUS 473. GERMAN DICTION FOR SINGERS (2). Presents the principles of German lyric diction and provides practice in the skills needed to sing the language accurately and expressively.

MUS 474. FRENCH DICTION FOR SINGERS (2). Presents the principles of French lyric diction and provides practice in the skills needed to sing the language accurately and expressively.

MUS 493. BASIC RECORDING TECHNIQUES (3). The first of a three-term sequence on analog and digital recording and editing techniques. The first term deals with issues such as signal processing, microphone design and placement, and an introduction to Digidesign Pro-Tools. This course is repeatable for a maximum of 9 credits. **PREREQS:** MUS 123 and instructor approval required.

MUS 494. INTERMEDIATE RECORDING TECHNIQUES (3). The second of a three-term sequence on analog and digital recording and editing techniques. The second term deals with multi-track recording, MIDI interfacing and recording, advanced microphone placement, intermediate Pro-tools, and an introduction to E-magic Logic. **PREREQS:** MUS 493 and instructor approval required.

MUS 495. ADVANCED RECORDING TECHNIQUES (3). The third of a three-part sequence on analog and digital recording and editing techniques. The third term deals with advanced multi-track recording, sampling MIDI interfacing and recording, mixing and mastering using Waveburner, advanced Pro-Tools, advanced use of E-magic Logic recording and editing and portable ADAT recording and editing. **PREREQS:** MUS 494 and instructor approval required.

MUS 496. SURROUND SOUND RECORDING AND MASTERING (2). Survey of the concepts, equipment, and standard procedures used in surround sound audio and audio-for-video, including basic equipment and software configuration, surround recording and editing techniques, advanced automation using Pro Tools, and layback/sync to video. **PREREQS:** MUS 495 and /or instructor approval.

MUS 499. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUS 501. RESEARCH AND SCHOLARSHIP (1-6). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUS 502. INDEPENDENT STUDY (1-6). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUS 503. THESIS (1-6). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

MUS 505. READING AND CONFERENCE (1-6). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUS 506. PROJECTS (1-6). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUS 507. SEMINAR (1-6). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUS 508. WORKSHOP (1-6). This course is repeatable for a maximum of 18 credits. **PREREQS:** Departmental approval required.

MUS 510. INTERNSHIP (3). Provides experience in field settings, opportunity to develop personal and professional skills. See school for details. This course is repeatable for a maximum of 12 credits. **PREREQS:** School approval required.

MUS 516. ADVANCED CONDUCTING: CHORAL (3). Baton technique, interpretation and the study of major choral scores. **PREREQS:** MUS 317

MUS 517. ADVANCED CONDUCTING: CHORAL (3). Baton technique, interpretation and the study of major choral scores. **PREREQS:** MUS 317

MUS 518. ADVANCED CONDUCTING: INSTRUMENTAL (3). Baton technique, interpretation and the study of major instrumental scores. **PREREQS:** MUS 319

MUS 519. ADVANCED CONDUCTING: INSTRUMENTAL (3). Baton technique, interpretation and the study of major instrumental scores. **PREREQS:** MUS 319

MUS 540. OSU CHAMBER CHOIR (1-2). A select ensemble of approximately 40 mixed voices. Performance each term. Annual tours. 500-level credit available only to students who can demonstrate proficiency and experience to perform at the graduate level. This will be evaluated by the instructor through audition. This course is repeatable for a maximum of 6 credits.

MUS 543. THEORY AND COMPOSITION STUDIES (3). Intensive study of selected subjects, such as analysis, composition, choral arranging, band arranging, and orchestration. See Schedule of Classes for topic. This course is repeatable for a maximum of 18 credits. **PREREQS:** MUS 223

MUS 546. WOMEN'S CHOIR (1-2). A women's ensemble designed for vocal development and exploration of treble choral literature. Performances each term. This course is repeatable for a maximum of 9 credits. **PREREQS:** Students must be in a graduate-level program of study.

MUS 547. MEN'S CHOIR (1-2). A men's ensemble designed for vocal development and exploration of TTBB choral literature. Performances each term. This course is repeatable for a maximum of 9 credits. **PREREQS:** Students must be in a graduate-level program of study.

MUS 550. SYMPHONIC BAND (1). A select ensemble of approximately 80 wind and percussion players. Performance winter and spring terms. 500-level credit available only to students who can demonstrate proficiency and experience sufficient to perform at the graduate level. This will be evaluated by the instructor by audition. This course is repeatable for a maximum of 6 credits.

MUS 560. UNIVERSITY SYMPHONY ORCHESTRA (1). An ensemble of 65-80 players. Performance of orchestral repertoire from the 18th, 19th, and 20th centuries. Performance each term. 500-level credit available only to students who can demonstrate proficiency and experience to perform at the graduate level. This will be evaluated by the instructor through audition. This course is repeatable for a maximum of 6 credits.

MUS 563. ACCOMPANYING (1). Piano accompanying and chamber music skills, studio experience and weekly performance class. 500-level credit available only to students who can demonstrate proficiency and experience sufficient to perform at the graduate level. This will be evaluated by the instructor by audition. This course is repeatable for a maximum of 6 credits. **PREREQS:** Should take MUP 590 concurrently.

MUS 572. ITALIAN AND LATIN DICTION FOR SINGERS (2). Presents the principles of lyric diction in Italian and liturgical Latin and provides practice in the skills needed to sing the languages accurately and expressively.

MUS 573. GERMAN DICTION FOR SINGERS (2). Presents the principles of German lyric diction and provides practice in the skills needed to sing the language accurately and expressively.

MUS 599. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 6 credits. **PREREQS:** Departmental approval required.

■ NEW MEDIA COMMUNICATIONS COURSES

NMC 101. INTRODUCTION TO NEW MEDIA COMMUNICATIONS (3). Principles of new media communications. Perspectives on the communications media. How the communications media operate and how they interact with society.

NMC 183. INTRODUCTION TO MEDIA PRODUCTION (3). Provides core competency in media production: an introduction to audio and video production, and the elements of the media production and post production processes.

NMC 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

NMC 240. SURVEY OF SOCIAL MEDIA (3). Social media are curiously positioned as being both emergent media and convergent media – they function because of the coalescence of existing media forms and the creation of new ones. This class will use multiple perspectives to explore the past, present, and future of social media. **PREREQS:** NMC 101

NMC 255. INTRODUCTION TO SOUND DESIGN (3). The principals and practices of sound design for motion pictures, television and radio. Through reading, viewing, listening and discussion, students will learn the art and science of sound design. Topics include the soundtrack and film narrative--basic terms and concepts; narrative, psychological and emotive functions of sound design; components of the soundtrack--dialogue, music and sound effects; sound design process--recording, editing, mixing and exhibition.

NMC 260. NEW MEDIA FUTURES (3). Historical context and current perspectives on the various aspects of new multimedia communications, including linear and nonlinear or time-based and interactive media. Primary topics include digital cinema (compositing and nonlinear access), visual music, information visualization, interactive narrative, and virtual space.

NMC 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

NMC 301. ^WRITING FOR THE MEDIA PROFESSIONAL (3). Fundamentals of gathering information, evaluating information, writing information of the media and editing media content in written form. (Writing Intensive Course) **PREREQS:** NMC 101

NMC 302. REPORTING (3). An introduction to the practices, procedures, techniques, and organizational structures of basic news gathering and writing. **PREREQS:** WR 201

NMC 305. COPYEDITING (3). Copyreading, headline writing, newspaper layout and design.

NMC 320. HISTORY OF TELECOMMUNICATIONS (3). A historical overview of the telecommunications industry. The goal is to understand how the industry got where it is today and, by analyzing principles, events, and trends, suggest what directions it may take in the future. The emphasis is on constructing a causal chronology, interrelating developments in technology, organization, and structure of the industry. This course will focus on the technological developments in the industry.

NMC 321. HISTORY OF BROADCASTING (3). The technological, economic and corporate, legal and political, artistic, and social developments that shaped American broadcasting in the 20th century are examined. Implications for the future of broadcasting are addressed as well. **PREREQS:** NMC 101

NMC 322. LANDMARKS IN MEDIA CONTENT (3). Introduces students to media content that represents advances in the art and science of creative use of media technology. Some of these advances were recognized immediately, some only after time had passed. **PREREQS:** NMC 101

NMC 330. THE MEANING OF VIDEO GAMES (3). Examines approaches to understanding the experience of playing video games, including the role of storytelling in diverse games, the relationship between the player and the game, the game as art, and intersections between games and real life. **PREREQS:** NMC 101

NMC 340. SOCIAL MEDIA STRATEGY (3). Designing systems of interaction is important for understanding how people come to be a part of social networks. Students will participate in a series of simulation games that will explore the dimensions of the interaction between publics and social networks, culminating in an original research project. **PREREQS:** NMC 101 and NMC 240

NMC 349. VIDEO ART (4). Studio course in video art and time-based media projects. Emphasis on experimental approaches to video art in a contemporary art context, linear and non-linear video production and the projection and screening of video art projects. Introduction to the history of video art as an art form. Lec/studio. **CROSSLISTED** as ART 349. This course is repeatable for a maximum of 8 credits. **PREREQS:** ART 122 and ART 263 and ART 345

NMC 351. NEW MEDIA VISUALIZATION (3). Principles of visual composition, sequential imagery, interactive design, narrative structure, and cinematic language as they relate to new media communications. **PREREQS:** NMC 101

NMC 380. PRE-PRODUCTION (3). Focuses on pre-production or the planning phase of multimedia production, which includes concept development, scriptwriting, storyboarding, budgeting, and talent/location scouting. Class projects emphasize brainstorming, story concept/structure, conceptual art, storyboards, animatics, and interactive design. Class examines narrative structure and the languages of graphic design, cinema, and interactive story. Lec/studio. **PREREQS:** NMC 101

NMC 382. STUDIO AND MULTICAMERA PRODUCTION (4). Proficiency in organizing, producing, directing, and evaluating television programs using multicamera studio techniques, including graphics, set design, audio for television and digital video production, and lighting. Emphasis on bringing ideas from conception to realization in a studio setting. Lec/lab. **PREREQS:** NMC 101

NMC 383. FIELD PRODUCTION (4). Development of the technical abilities and conceptual approaches to audio, film, video and multimedia production. Emphasis on single-camera production techniques and concepts. Students will begin the study of post-production process. Students will also begin to study lighting and audio as they relate to single-camera field production. **PREREQS:** NMC 101

NMC 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

NMC 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

NMC 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

NMC 403. THESIS/DISSERTATION (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

NMC 404. WRITING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

NMC 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

NMC 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

NMC 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

NMC 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

NMC 409. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

NMC 410. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Students must have completed 15 credits with the NMC prefix to be eligible for an NMC internship. Departmental approval required.

NMC 421. *DIFFUSION OF INNOVATIONS (3). An introduction to old and emerging theories that explain the spread of innovative ideas and technologies among members of a society, emphasizing the role of communication processes and the special problems for diffusion in communication technology. (Bacc Core Course) **PREREQS:** NMC 101

NMC 427. *DIGITAL PORNOGRAPHY (3). Exploration of the prominent role pornography plays in digital communication innovation globally including the examination of social consequences; diffusion of technology, business models and economic impact; legal, ethical, and moral issues; and community health and well-being. (Bacc Core Course) **PREREQS:** Junior or senior standing. This requirement is to ensure all students are over the age of 18 and are able to synthesize complex social and technological concepts and trends appropriate for an STS course.

NMC 430. MEDIA THEORY (3). Specifies the concepts, hypotheses, and theoretical paradigms that have characterized the study of media since the early 20th century. The evolution of theory as new media has changed the media economy is emphasized, as well as the need for new concepts to describe phenomena unique to the Internet era (concepts such as "blogging" and "instant messaging"). **PREREQS:** NMC 101

NMC 433. NEW MEDIA STORY TELLING (3). Students will study and develop storytelling methods using new media communications technology. Storytelling will focus on telling stories using non-linear, interactive, multidimensional, multi-sensory, multimedia techniques. **PREREQS:** NMC 101

NMC 435. MEDIA EFFECTS (3). Reviews the potential for media technology and media content to influence the beliefs and behaviors of individuals. The media's ability to bring about specific changes in people's attitudes, values, political agendas, purchasing habits, and jury decisions are discussed. The impact of new media's interactive technology and content on people's beliefs and behaviors is emphasized. **PREREQS:** NMC 101

NMC 437. NEW MEDIA AND SOCIETY (3). Traces the impact of new media--from the telegraph to the Internet--on American society. Emphasizes the way that existing social institutions (e.g. schools and churches) and opinion leaders (e.g. presidents and scholars) greeted the arrival of new media with an increasingly predictable mixture of fear and euphoria. Social changes such as the westward expansion of the U.S. in the 19th century, the arrival of immigrants in the late 19th and early 20th centuries, and the rise of youth culture in the mid-20th century are discussed in terms of their connection to developments in the technology and structure of media. The integration of Internet-

based services into contemporary American society is the focus of one-half of the course. **PREREQS:** NMC 101

NMC 440. MEDIA MANAGEMENT (3). Principles of management and their application to new media. The practice of new media management including personnel, programming, sales and promotions. Students will gain an understanding of the business side of the media industries. Students will also develop the analytical methods and problem solving techniques used in the management decision-making process as they relate to the mass media. Students will study the media of radio, broadcast television, cable television, DBS, MMDS, SMATV, satellite, telephony, Internet, film, the recording industry, advertising and public relations, as well as emerging media businesses. **PREREQS:** NMC 101

NMC 441. MEDIA ENTREPRENEURSHIP (3). Studies the entrepreneurial process as it relates uniquely to the arts and sciences of new media. Students will study the basic entrepreneurial processes of law, finance, accounting, organizational structure, budgeting, business plans, market analyses, taxes, licensing, and insurance as they relate to new media enterprises. Students will also study the sales/revenue generation side of new media ventures.

NMC 470. MEDIA LAW (3). The relevant laws and regulations that govern the mass media; the participants in the law making process; the analytical methods and problem solving techniques used in the law making process; the laws and policies affecting journalists. Issues such as libel, privacy, obscenity, indecency, fair trail/free press and copyright are covered. **PREREQS:** NMC 101

NMC 471. TELECOMMUNICATIONS POLICY (3). Covers past and present telecommunications policy. Examines the agencies that govern the telecommunications industry, including the Federal Communications Commission. Studies the differences and similarities between the regulation associated with public and private telecommunications systems and services. Students will gain knowledge of telecommunications industry ownership regulations, including antitrust regulation of the telecommunications industry. **PREREQS:** NMC 101

NMC 481. POST PRODUCTION (4). Advanced film and video production with emphasis on techniques, equipment, and theories involved in editing film and video. Emphasis on the use of computer-based nonlinear editing systems. Students will also study the use of special effects in visual production. **PREREQS:** NMC 101 and NMC 383

NMC 482. DOCUMENTARY (4). Theory and production of the documentary genre. The class covers all stages of producing a documentary film from the idea through development, marketing, planning, shooting, editing, and post-production. **PREREQS:** NMC 101 and NMC 383

NMC 483. NEW MEDIA 3-D (4). Hands-on introduction to the world of 3-D computer modeling and animation, including investigations of light, texture, form, spatial design and motion. Course includes discussions of professional and artistic practice and critique of student and professional work. Lec/lab.

NMC 484. NEW MEDIA ANIMATION (4). An in-depth theoretical and hands-on investigation of advanced animation tools and techniques used for educational, scientific, entertainment, and expressive communication projects. Tools and techniques covered include motion capture (full body, face, hand), automated lip-sync dialogue processing, dynamic simulation, particle motion, and other simulation or performance-based animation approaches. Students will work individually and in teams to explore the communicative and creative possibilities of the described technologies. **PREREQS:** NMC 101

NMC 490. MEDIA ETHICS (3). Exploration of the ethical issues surrounding new media communications. Topics include professionalism in journalism, new media visual production, new media management, advertising, film, and public relations. Topics also include new media's relationship with society, violence in the media, and sex in the media. **PREREQS:** NMC 101

NMC 498. CAPSTONE PROJECTS (3). Senior-level course designed to integrate the skills and knowledge obtained through NMC course work into a group research and/or production project that will be useful to students for their professional portfolio or serve as the basis for academic publication. **PREREQS:** NMC 101 and senior standing and departmental approval.

NMC 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

■ THEATRE ARTS COURSES

TA 121. ORAL INTERPRETATION I (3). Analysis and presentation of literature. Exploration of emotional reactions, expressive vocal and physical responses, and performing techniques for effective communication. (FA)

TA 144. PLAYREADING (1). Reading/discussion/examination of plays from world theatre of past and present from the perspective of production and theatre history. This course is repeatable for a maximum of 2 credits.

TA 147. *INTRODUCTION TO THE THEATRE (3). Origins, history, nature, elements, and style of theatre production; function of artists and craftspeople of the theatre. (FA) (Bacc Core Course)

TA 147H. *INTRODUCTION TO THE THEATRE (3). Origins, history, nature, elements, and style of theatre production; function of artists and craftspeople of the theatre. (FA) (Bacc Core Course) **PREREQS:** Honors College approval required.

TA 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

TA 242. VISUAL PRINCIPLES OF THEATRE (3). An introduction to visual creativity, creative thinking, and visual problem solving as applied to theatre arts as a whole, and to scene and costume design. (FA)

TA 243. PRINCIPLES OF COSTUMING FOR THE STAGE (3). Principles and techniques of costume construction; practical application in the costume shop on theatre production. **PREREQS:** TA 147 and TA 242

TA 244. SCENE CRAFTS (3). Constructing scenery and stage properties; practical experience in backstage procedures and scene painting. Lec/lab. (FA)

TA 245. STAGE LIGHTING (3). Fundamentals of electricity as used in stage lighting; color and light, lighting instruments and control systems, theory and practice of lighting stage production. **PREREQS:** TA 244

TA 247. STAGE MAKEUP (3). Basic principles and theory with laboratory experience in most-used applications of theatrical makeup. **PREREQS:** Preference given to TA majors.

TA 248. FUNDAMENTALS OF ACTING I (3). Examination of basic principles and techniques of acting. Exploration of relaxation/focus, personal vocal/physical awareness, the actor's craft, and the performance process. (FA) **PREREQS:** TA 147 or instructor approval required.

TA 249. FUNDAMENTALS OF ACTING II (3). Continued work in the basic principles and techniques of acting. Emphasis on improvisation, character analysis, and creation, the balance between truth and technique. **PREREQS:** TA 248 and TA 248 or instructor approval required.

TA 250. WORKSHOP: THEATRE ARTS (1-3). Practical experience in performance, technical

theatre, or design. Maximum for 6 credits may be applied toward graduation. This course is repeatable for a maximum of 6 credits. **PREREQS:** Departmental approval required.

TA 250H. WORKSHOP: THEATRE ARTS (1-3). Practical experience in performance, technical theatre, or design. Maximum for 6 credits may be applied toward graduation. This course is repeatable for a maximum of 6 credits. **PREREQS:** Departmental approval required and Honors College approval required.

TA 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

TA 321. ADVANCED ORAL INTERPRETATION (3). Interpretative theory; programming, adapting materials for oral interpretation, reader's theatre, chamber theatre experimentation in presentational forms. Offered every third year. **PREREQS:** TA 121

TA 330. *HISTORY OF THE THEATRE (3). The rise and development of the composite arts of the theatre in their cultural and social context. Origins to 1500. Offered alternate years. (H) (Bacc Core Course)

TA 331. *HISTORY OF THE THEATRE (3). The rise and development of the composite arts of the theatre in their cultural and social context. 1500 to 1870. Offered alternate years. (H) (Bacc Core Course) **PREREQS:** TA 144 and TA 147 are recommended.

TA 332. **HISTORY OF THE THEATRE (3). The rise and development of the composite arts of the theatre in their cultural and social context. 1870 to present. Offered alternate years. (H) (Bacc Core Course) (Writing Intensive Course) **PREREQS:** TA 144 and TA 147 are recommended.

TA 344. PLAYSRIPT ANALYSIS (3). Study of major approaches to playscript analysis and detailed application of these systems to the theatrical production process. (H) **PREREQS:** TA 147 and TA 144

TA 346. SCENE AND STAGE DESIGN (3). Designs for stage productions including elements of color, mass, line, and lighting for various types of theatre architecture and plays. Offered alternate years. **PREREQS:** TA 147 and TA 244

TA 348. ADVANCED ACTING: REALISM (3). Discussion, research, rehearsal, performance, and criticism of scenes from realistic drama. Emphasis on the craft of acting, emotional availability/honesty, personal awareness. Offered alternate years. **PREREQS:** TA 248 and instructor approval required.

TA 349. ADVANCED ACTING: STYLES (3). Discussion, research, rehearsal, performance, and criticism of scenes from a range of period and genre styles. Offered alternate years. **PREREQS:** TA 248 and instructor approval required.

TA 350. WORKSHOP: THEATRE ARTS (1-3). Advanced work in acting, directing or technical theatre in dramatic productions; laboratory experience. Maximum of 6 credits may be applied toward graduation. This course is repeatable for a maximum of 6 credits. **PREREQS:** Departmental approval required.

TA 351. PRINCIPLES OF PLAYWRITING (3). Basic principles and techniques of playwriting. Offered alternate years. **PREREQS:** TA 144 and TA 344

TA 352. PLAYWRITING WORKSHOP (3). Intensive work on student playscripts generated in TA 351, through re-writes, revision and rehearsals. Offered alternate years. **PREREQS:** TA 351

TA 354. FUNDAMENTALS OF PLAY DIRECTION (3). History, theories and techniques of stage direction. Script analysis, study of the audience, staging, working with actors and designers, the production process. Emphasis on practical exploration and application. Offered alternate years. **PREREQS:** TA 244 and TA 248 and instructor approval required.

TA 360. *MULTICULTURAL AMERICAN THEATRE (3). Examines the rich panorama of multicultural-American theatre (e.g. African-American, gay and lesbian, Hispanic, Asian American). (H) (Bacc Core Course)

TA 360H. *MULTICULTURAL AMERICAN THEATRE (3). Examines the rich panorama of multicultural-American theatre (e.g. African-American, gay and lesbian, Hispanic, Asian American). (H) (Bacc Core Course)

TA 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

TA 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TA 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TA 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TA 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TA 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TA 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

TA 407H. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

TA 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TA 410. THEATRE ARTS INTERNSHIP (1-16). One- to three-term residency in a producing theatre, for a maximum allowable total of 15 credits. Student works in a department of the theatre and in related production activities, according to areas of interest or specialization. Work supervised and evaluated by agency staff; academic evaluation by supervising department faculty member(s). Available to upper-division theatre arts majors and graduate students approved by faculty and selected by intern agency. This course is repeatable for a maximum of 15 credits. **PREREQS:** 27 credits of theatre arts, with a minimum of 6 credits in area of skill specialization, or 12 credits of upper-division theatre arts courses, with a minimum of 6 credits in area of skill specialization. Must be arranged with instructor prior to registration. Departmental approval required.

TA 416. TOPICS IN THEATRE ARTS (3). Lectures and explorations of theories, issues, methods, problems, and applications in theatre arts. Concentrated work in a variety of selected theatre topics. Offered as demand and staffing allow. This course is repeatable for a maximum of 12 credits. **PREREQS:** 9 credits of theatre arts or instructor's approval required.

TA 443. COSTUME DESIGN (3). Theory and practice of designing costumes for a theatrical production. **PREREQS:** TA 243

TA 444. *THEORY AND CRITICISM OF THEATRE ARTS (3). Major theories that have influenced and motivated theatre practice in Western civilization throughout its development. Offered on alternate years. (Writing Intensive Course) **PREREQS:** 6 credits of theatre history, or 6 credits of dramatic literature.

TA 450. STUDIO: THEATRE ARTS (3-6). Advanced individual study on approved projects in one of the arts of the theatre: acting, directing or scene/costume/lighting design; or in stage or theatre management. This course is repeatable for a maximum of 6 credits. **PREREQS:** 9 credits of upper-division theatre arts. Departmental approval required.

TA 454. ADVANCED PLAY DIRECTION (3). Expanded exploration of directing theories and techniques. Practical application through the production of a one-act play in a laboratory theatre. Offered alternate years. **PREREQS:** TA 354 and instructor approval required.

TA 464. THEATRE MANAGEMENT (3). Managerial theory and practices of theatre operations, including organizational structure, financial practices, program promotion, and legal concerns. Offered alternate years. **PREREQS:** 6 credits of upper-division theatre arts courses of equivalent; junior or senior standing.

TA 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

TA 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TA 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

TA 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TA 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TA 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

TA 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

TA 510. THEATRE ARTS INTERNSHIP (6-15). One- to three-term residency in a producing theatre, for a maximum allowable total of 15 credits. Student works in a department of the theatre and in related production activities, according to areas of interest or specialization. Work supervised and evaluated by agency staff; academic evaluation by supervising department faculty member(s). Available to upper-division theatre arts majors and graduate students approved by faculty and selected by intern agency. This course is repeatable for a maximum of 15 credits. **PREREQS:** 27 credits in theatre arts, with a minimum of 6 credits in area of skill specialization, or 12 credits of upper-division theatre arts courses, with a minimum of 6 credits in area of skill specialization. Must be arranged with instructor prior to registration. Departmental approval required.

TA 516. TOPICS IN THEATRE ARTS (3). Lectures and explorations of theories, issues, methods, problems, and applications in theatre arts. Concentrated work in a variety of selected theatre topics. Offered as demand and staffing allow. This course is repeatable for a maximum of 12 credits. **PREREQS:** 9 credits of theatre arts or instructor's approval required.

TA 543. COSTUME DESIGN (3). Theory and practice of designing costumes for a theatrical production. **PREREQS:** TA 243

TA 544. THEORY AND CRITICISM OF THEATRE ARTS (3). Major theories that have influenced and motivated theatre practice in Western civilization throughout its development. Offered on alternate years. **PREREQS:** 6 credits of theatre history or 6 credits of dramatic literature.

TA 550. STUDIO: THEATRE ARTS (3-6). Advanced individual study on approved projects in one of the arts of the theatre: acting, directing or scene/costume/lighting design; or in stage or theatre management. This course is repeatable for a maximum of 6 credits. **PREREQS:** 9 credits of upper-division theatre arts. Departmental approval required.

TA 554. ADVANCED PLAY DIRECTION (3). Expanded exploration of directing theories and techniques. Practical application through the

production of a one-act play in a laboratory theatre. Offered alternate years. **PREREQS:** TA 354 and instructor approval required.

TA 564. THEATRE MANAGEMENT (3). Managerial theory and practices of theatre operations, including organizational structure, financial practices, program promotion, and legal concerns. Offered alternate years. **PREREQS:** 6 credits of upper-division theatre arts courses of equivalent and junior or senior standing.

SCHOOL OF HISTORY, PHILOSOPHY, AND RELIGION

Ben Mutschler, Interim Director

Nicole von Germeten, Associate Director, History

Joseph Orosco, Associate Director, Philosophy

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FACULTY

Professors Campbell, Ferngren, Guerrini, Husband, Katz, Kopperman, Leibowitz, Luft, Moore, Osborne, Uzgalis

Associate Professors Blumenthal, Carson, Chappell, Clough, Hamblin, Ip, Kaplan, Mutschler, Orosco, Rubert, von Germeten

Assistant Professors Jenkins, Koehlinger, Nichols, Ritzheimer, Sarbacher, Smith, Thompson

Undergraduate Majors

History (BA, HBA)
Philosophy (BA, BS, HBA, HBS)

Minors

History
Philosophy

Undergraduate Certificates

Applied Ethics
Medical Humanities
Peace Studies
Religion and Culture

Graduate Majors

Applied Ethics (MA, MAIS)

Graduate Areas of Concentration
Art and Morality
Bioethics
Environmental Ethics

History of Science (MA, MAIS, MS, PhD)

Graduate Minors

Applied Ethics
History

Graduate Areas of Concentration

American History (U.S.)

Western U.S. History

European History

Non-American and Non-European History (Asian, African, Latin American, Islamic)

History of Science

Graduate Areas of Concentration

Development of the Physical, Biological, and Environmental Sciences

History of Science and Medicine

Intellectual and Social History of Science in Europe and the U.S.

Philosophy

Graduate Areas of Concentration

Aesthetic Theory

Ethics (including environmental ethics and biomedical ethics)

History of Philosophy

Logic and Philosophy of Science

Religious Studies

HISTORY

The School of History, Philosophy, and Religion offers major programs leading to a BA degree. Courses provide fundamental background for the social sciences and humanities and are of special value to students of government, education, law, science, journalism, and business. History majors go on to careers in teaching and jobs requiring a liberal arts background.

BA candidates must have proficiency at the second-year college level of a foreign language.

The school also offers a minor program for undergraduates with majors in other fields.

PHILOSOPHY

The School of History, Philosophy, and Religion offers a BA or BS degree in Philosophy, a Philosophy minor, an undergraduate and postbaccalaureate certificate in Applied Ethics, an MA in Applied Ethics, and participates in the Master of Arts in Interdisciplinary Studies (MAIS) program with a focus on applied ethics and other areas of philosophy. The school's Program for Ethics, Science, and the Environment (PESE) supports multidisciplinary education and scholarship on ethical and policy issues that are raised by advances in scientific knowledge, biotechnology, and natural resource use.

The Spring Creek Project seeks to bring together the practical wisdom of the environmental sciences, the clarity of philosophical analysis, and the creative, expressive power of the written word, to find new ways to understand and re-imagine our relation to the natural world.

Baccalaureate core courses are taught for students interested in broadening their intellectual horizons, developing their abilities for intellectual criticism,

and enlarging their understanding of social, ethical, religious, political, and aesthetic values in contemporary society and world cultures. Many philosophy courses have content that is relevant to the interests of women and minority students.

The school invites non-majors to combine study of philosophy with their major program by enrolling in the philosophy minor or the Applied Ethics certificate program.

Students interested in philosophy programs should contact or visit the school's undergraduate advisor or director of graduate studies.

HISTORY OF SCIENCE

The School of History, Philosophy, and Religion offers the degrees of Master of Arts (MA), Master of Science (MS) and Doctor of Philosophy (PhD) in History of Science. The History of Science graduate program provides professional training in the interdisciplinary subject of history of science. The program connects the humanities, social sciences, and natural sciences by studying and interpreting the development of the sciences within particular historical settings and analyzing the changing roles of the sciences within modern cultures. Emphasis in the program is on scientific traditions since the sixteenth century in Europe and North America, in the physical, earth, biological, medical, and social sciences, as well as on environmental history and the history of the environmental sciences.

MA IN APPLIED ETHICS DEGREE

The MA in Applied Ethics provides students skills in moral reasoning and an understanding of the ethical values and dilemmas in today's world. Students will be able to identify, analyze and suggest solutions to ethical problems that arise in their professional and civic lives.

MAIS DEGREE

The school also participates in the Master of Arts in Interdisciplinary Studies (MAIS) degree program. In other advanced degree programs, philosophy may be used as a minor. See the graduate section of this catalog for details.

UNDERGRADUATE MAJORS WITH OPTIONS

History (BA, CRED, HBA)

Minimum total credits (49)

Minimum upper-division credit (33) Courses that must be included in the 49 credits:

HST 101, HST 102, HST 103. *History of Western Civilization (or equivalent European courses approved by advisor) (4,4,4)
HST 104. *World History I: Ancient Civilizations (3)
HST 105. *World History II: Middle and Early Modern Ages (3)

HST 106. *World History III: The Modern and Contemporary World (3)
(or equivalent non-European, non-U.S. history courses approved by advisor)

HST 201, HST 202, HST 203. *History of the United States (or equivalent American courses approved by advisor) (4,4,4)

Courses in a non-European, non-U.S. history area (4)

4 credits in each of the following, for a total of 12 credits:

European history or History of Science
U.S. history or History of Science
Non-European/Non-U.S. history
HST 310. The Historian's Craft (4)
HST 407. ^Seminar (4)
History electives (12) History of Science courses may count as electives.

Freshman/Sophomore Years (20)

HST 101, HST 102, HST 103. *History of Western Civilization (4,4,4)

HST 104. *World History I: Ancient Civilizations (3)

HST 105. *World History II: Middle and Early Modern Ages (3)

HST 106. *World History III: The Modern and Contemporary World (3)

HST 201, HST 202, HST 203. *History of the United States (4,4,4)

Junior Year (12)

Non-European/Non-U.S. History (4)
HST 310. The Historian's Craft (4)

History electives (4)

Senior Year (21)

HST 407. ^Seminar (4)

History electives (4)

4 credits in each of the following, for a total of 12 credits:

European; U.S.
Non-European/Non-U.S.

Footnotes:

* Baccalaureate Core Course
^ Writing Intensive Course (WIC)

PHILOSOPHY (BA, BS, CRED, HBA, HBS)

An undergraduate major in philosophy provides a broad education and intellectual skills that are useful in many occupations and areas of life. It is also valuable background for graduate study in philosophy and religious studies and for advanced study in such professional fields as law and public service.

- At least 32 credits must be upper division.
- At least 12 credits must be 400 level.
- All courses offered by the School of History, Philosophy, and Religion must be graded, no S/U.
- Only courses with C- or better will be accepted for the major.
- Students must have a 2.5 GPA in those courses offered by the school.

Philosophical Foundations (10–12)

PHL 101. Critical Thinking (4)
or PHL 121. *Reasoning and Writing (3)
PHL 251. *Knowers, Knowing, and the Known (4)
PHL 205. *Ethics (4)

Philosophical Perspectives (24–27)

PHL 301, PHL 302, PHL 303. *History of Western Philosophy (4,4,4)

Select one Logic course:

PHL 321. Deductive Logic (4)
PHL 325. *Scientific Reasoning (4)
PHL 421. Mathematical Logic (3)

Select one Value Theory or one Metaphysics/Epistemology course from the two lists below (3–4):

Value Theory:

PHL 207. *Political Philosophy (4)
PHL 342. Contemporary Ethics (4)
PHL 344. *Pacifism, Just War, and Terrorism (4)
PHL 360. *Philosophy and the Arts (4)
PHL 365. *Law in Philosophical Perspective (4)
PHL 390. Moral Theories (3)
PHL 417. Feminist Philosophies (3)
PHL 430. History of Buddhist Philosophy (4)
PHL 439. Philosophy of Nature (3)
PHL 440. Environmental Ethics (3)
PHL 499. Topics in Philosophy [some qualify; check with professor] (1–4)

OR:

Metaphysics/Epistemology:

PHL 325. *Scientific Reasoning (4)
PHL 365. *Law in Philosophical Perspective (4)
PHL 430. History of Buddhist Philosophy (4)
PHL 436. Philosophy and Religion (3)
PHL 451. Knowledge and Reality (3)
PHL 470. Philosophy of Science (3)
PHL 474. Philosophy of Biology (4)
PHL 499. Topics in Philosophy [some qualify; check with professor] (1–4)
Diversity: Select one course from below (3–4):
PHL 208. Introduction to Buddhist Traditions (4)
PHL 280. *Ethics of Diversity (4)
PHL 312. *Asian Thought (4)
PHL 316. Intellectual Issues of Mexico and Mexican Americans (4)
PHL 371. *Philosophies of China (4)
PHL 380. *The Body, Medicine, and Culture (3)
PHL 417. Feminist Philosophies (3)
PHL 430. History of Buddhist Philosophy (4)
PHL 448. Native American Philosophies (3)
PHL 499. Topics in Philosophy: [some qualify; check with professor] (1–4)
PHL 407. Seminar (3)
Electives (12–16) Consultation with advisor is required.

Total=46–55 (14–15 courses)

UNDERGRADUATE MINORS

HISTORY MINOR

Also available via Ecampus.

Undergraduate students may elect a minor in History to complement course work in their major discipline. History minors must complete 28–29 credits, depending on the area:

U.S. History

HST 201, 202, 203. *History of the United States (4,4,4) (or equivalent)
Minimum of 12 upper-division credits in

U.S. history courses (300+ level)
Additional history credits (any history courses) (4)

European History

HST 101, 102, 103. *History of Western Civilization (4,4,4) (or equivalent)

Minimum 12 upper-division credits in "European" history (300+ level)

Additional history credits (any history courses) (8)

Non-European, Non-U.S. History (African, Asian, Islamic World, Latin American History)

HST 104. *World History I: Ancient Civilizations (3) (or equivalent)

HST 105. *World History II: Middle and Early Modern Ages (3) (or equivalent)

HST 106. *World History III: The Modern and Contemporary World (3) (or equivalent)

Minimum 12 upper-division credits in non-European, non-U.S. history (300+ level)

Additional history credits (any history courses) (8)

All courses for a History minor must be taken for graded credit. Minor courses may be used to fulfill baccalaureate core, CLA, and minor requirements.

PHILOSOPHY MINOR

The Philosophy minor allows students to specialize in such areas as ethics, legal and political philosophy, philosophy and religion, non-Western philosophies and religious ideas, philosophy of art, logic, philosophy of science, and the history of philosophy.

History of Philosophy—Select one course from:

PHL 301. *History of Western Philosophy (4)

PHL 302. *History of Western Philosophy (4) or PHL 303. *History of Western Philosophy (4)

Logic—Select one course from:

PHL 101. Critical Thinking (4)

PHL 121. *Reasoning and Writing (3)

PHL 321. Deductive Logic (4)

PHL 325. *Scientific Reasoning (4)

or PHL 421. Mathematical Logic (3)

Concentration:

Students must arrange a minor area of concentration with approval of a faculty advisor.

Electives:

As many as needed to complete the total credit requirement.

Total must include 12 credits of upper-division with at least 3 credits at the 400 level.

Total=27

A grade of C– or better is required in all courses used to complete minor requirements. Only one elective may be taken with S/U grading.

GRADUATE MAJORS

APPLIED ETHICS (MA, MAIS)

Graduate Areas of Concentration

Art and morality, bioethics, environmental ethics

The MA in Applied Ethics is designed to provide students with skills of moral reasoning and an understanding of ethical values and dilemmas in today's world. Students will be able to identify, analyze and suggest solutions to ethical problems that arise in their professional and civic lives.

Students are required to take courses in ethical theory, as well as courses in applied ethics and in an appropriate disciplinary or integrated minor. Completion of the degree requires a practicum and thesis. Please note that Oregon State University also requires completion of two years of a foreign language for the master of art's degree.

Required Course of Study (45 credits minimum)

A. Philosophy Core (9)

PHL 525. Philosophical Methods (3)

PHL 541. Classical Moral Theories (3)

PHL 542. Contemporary Moral Theories (3)

B. Applied Ethics (15 credits, with maximum of 6 from PHL 501, PHL 502, PHL 505)

PHL 501. Research (1–16)

PHL 502. Independent Study (1–16)

PHL 505. Reading and Conference (1–16)

PHL 507. Seminar (1–16)

PHL 512. Great Figures in Philosophy (4)

PHL 517. Feminist Philosophies (3)

PHL 540. Environmental Ethics (3)

PHL 543. World View and Environmental Values (3)

PHL 544. Biomedical Ethics (4)

PHL 547. Research Ethics (3)

PHL 555. Death and Dying (3)

PHL 561. Art and Morality (3)

PHL 570. Philosophy of Science (3)

PHL 599. Topics in Philosophy (1–4)

C. PHL 510. Practicum (3–6)

D. PHL 503. Thesis (6–9)

E. Disciplinary or Integrated Minor (12)

HISTORY OF SCIENCE (MA, MS, PhD, MAIS)

Graduate Areas of Concentration

Development of the physical, biological, and environmental sciences; history of science and medicine; intellectual and social history of science in Europe and the U.S.

The graduate program leading to the MS, MA, and PhD is offered through the School of History, Philosophy, and Religion. Graduate work in the school may apply to the Master of Arts in Interdisciplinary Studies and to minors in other advanced-degree programs.

Students applying for graduate work in history must meet the following requirements:

1. Minimum overall undergraduate GPA of 3.00
2. Appropriate undergraduate course work in history
3. Have Graduate Record Examination scores sent to the School of History, Philosophy, and Religion

Course work in the history of science graduate major provides a critical perspective on the scientific enterprise through the centuries. It is valuable by graduate students in a variety of disciplines in the sciences and the humanities.

Admission Requirements

Students must have completed a four-year baccalaureate degree from an accredited college or university and have achieved a combined GPA of 3.00 on the last 90 quarter (60 semester) credits of graded undergraduate work of the first baccalaureate and all subsequent graded credits.

The applicant must submit photocopies of official transcripts of all previous academic work at the college or university level.

Applicants must also provide:

- A statement of the student's particular fields of interest and overall aims and purpose in the study of the history of science. An additional writing sample (no more than 25 pages) would be helpful to the graduate admissions committee.
- A photocopy of the official Graduate Record Examination (GRE) scores.
- Three letters of recommendation that specifically evaluate academic abilities and professional potential.

Graduate Degree Requirements

Requirements for a Master's Degree:

Either the MA or MS may be earned. The MA requires demonstration, either by course work or examination, of a reading knowledge of a foreign language appropriate for research. Both degrees require the successful completion of 45 graduate credits. Candidates are required to have a major field of at least 24 credits of course work (including historiography) from a list of approved history of science courses and a minor field of 15 credits of course work in science, history, or a related (or integrated) field; a thesis is optional.

Requirements for a Doctoral Degree:

The equivalent of three years of graduate work beyond the bachelor's degree is required including a doctoral thesis. This must include the requirements for, or the equivalent of, a master's degree in history of science. Course work should have history of science as a major; the minor field can be in science, history, or a related (or integrated) field. Generally one foreign language is required.

GRADUATE MINORS**APPLIED ETHICS
GRADUATE MINOR**

For more information, see the departmental advisor.

HISTORY GRADUATE MINOR

Graduate Areas of Concentration
American history (U.S.) Western U.S. history, European history, non-American and non-European history (Asian, African, Latin American, Islamic), history of science

Graduate work in the School of History, Philosophy, and Religion may apply to the Master of Arts in Interdisciplinary Studies degree and to minors in other advanced degree programs.

Students applying for graduate work in history must meet the following requirements:

1. Minimum overall undergraduate GPA of 3.00
2. Appropriate undergraduate course work in history
3. Have Graduate Record Examination scores sent to the School of History, Philosophy, and Religion.
4. History of Science Graduate Minor

Graduate Areas of Concentration
History of science and medicine, development of the physical, biological, and environmental sciences, intellectual and social history of science in Europe and the U.S.

Graduate work in the School of History, Philosophy, and Religion may apply to the Master of Arts in Interdisciplinary Studies and to minors in other advanced degree programs.

Students applying for graduate work in history must meet the following requirements:

1. Minimum overall undergraduate GPA of 3.00
2. Appropriate undergraduate course work in history
3. Have Graduate Record Examination scores sent to the School of History, Philosophy, and Religion.

PHILOSOPHY GRADUATE MINOR

Graduate Areas of Concentration
Aesthetic theory, ethics (including environmental ethics and biomedical ethics), history of philosophy, logic and philosophy of science, religious studies

The School of History, Philosophy, and Religion is committed to teaching students the skills and knowledge they need to reason cogently and decide wisely about difficult issues they will confront as citizens and professionals. The school offers graduate work leading to the Master of Arts in Interdisciplinary Studies degree with specialization in applied ethics and in other areas of philosophy and religious studies. The MAIS thesis op-

tion is encouraged. The study of applied ethics builds on a special strength among school faculty.

Graduate credit is offered in logic, ethics (including environmental ethics and biomedical ethics), aesthetics, religious studies, philosophy of science, contemporary philosophy, and history of philosophy. PHL 550 Ideas Matter is offered in conjunction with the "IDEAS MATTER" lecture series.

Prospective students should request additional program literature from the school. Some teaching assistantship support is available.

CERTIFICATES**APPLIED ETHICS CERTIFICATE**

The Applied Ethics undergraduate certificate builds upon the various courses in ethics taught in the School of History, Philosophy, and Religion and courses with ethics-related content found throughout the university, in order to provide students with a systematic and thorough understanding of the moral world for their civic, professional, and personal lives.

Students pursuing a major in any academic or professional field may also pursue applied ethics for educational interest and for professional preparation. The certificate adds a critical philosophical dimension to students' understanding of their professional aspirations.

Students seeking a baccalaureate degree at OSU may earn the Applied Ethics certificate by completing a minimum of 28 credits of approved course work.

For more information, contact Courtney Campbell, 541-737-5651, ccampbell@oregonstate.edu.

Philosophy Requirements

PHL 205. *Ethics (4)

12 credits from any of the following courses:

PHL 150. *Great Ideas in Philosophy (3)

PHL 280. *Ethics of Diversity (4)

PHL 325. *Scientific Reasoning (4)

PHL 342. Contemporary Ethics (4)

PHL 390. Moral Theories (3)

PHL 405. Reading and Conference (1–16)

PHL 417. Feminist Philosophies (3)

PHL 440. Environmental Ethics (3)

PHL 443. *Worldviews/Environmental Values (3)

PHL 444. *Biomedical Ethics (4)

PHL 450. Topics (1)

PHL 499. Topics in Contemporary Philosophy [w/approval] (1–4)

Elective Requirements (12)

Three concentrations of courses to achieve the 12 elective credits for the Applied Ethics certificate have already been established, but creating an individualized program is possible. The established concentrations are:

1. Ethics and scientific inquiry
2. Ethics and the environment

3. Ethics, health and medicine

Total=28

The Applied Ethics certificate coordinator will assist students in course selection from a list available in the School of History, Philosophy, and Religion.

**MEDICAL HUMANITIES
CERTIFICATE**

The undergraduate certificate in Medical Humanities offers OSU students a multi-disciplinary integrated program to study health, medicine and the healing professions. The certificate relies on key courses in medical anthropology, literature and medicine, medical history, and biomedical ethics for its core content foundations. Courses from additional different disciplines—biology; ethnic studies; exercise science; philosophy; political science; psychology; public health; religious studies; sociology; and women, gender, and sexuality studies—can fulfill complementary elective courses. In addition, the certificate program provides a team-taught colloquium on "the art of healing" that emphasizes skills in professional identity, reflective writing, cultural competency, and diversity as a complement to the scientific features of the healing professions. The certificate will prepare students to empathize with the sufferings of others, reflect critically on medical knowledge and discourse, create new representations of the medical experience, and confront moral, psychological, and ethical dilemmas.

For further information, please contact Courtney Campbell, 541-737-5651, ccampbell@oregonstate.edu.

**Medical Humanities Core
(minimum 10 credits)**

ANTH 345. *Biological and Cultural Constructions of Race (3)

ANTH 383. *Introduction to Medical Anthropology (3)

ENG 489/ENG 589. Writing, Literature and Medicine (4)

HSTS 416/HSTS 516. *History of Medicine Pre-1800 (4)

HSTS 417/HSTS 517. *History of Medicine (4)

PHL 299/HC 299. Selected Topics: *The Art of Healing* (2)

PHL 444/PHL 544. *Biomedical Ethics (4)

PHL 455/PHL 555. Death and Dying (3)

**Medical Humanities Electives
(minimum 17 credits)**

ANTH 240. Introduction to Biological Anthropology (3)

ANTH 345. *Biological and Cultural Constructions of Race (3)

ANTH 352. *Anthropology, Health, and Environment (3)

ANTH 361. Food Studies in Social Justice Perspective (4)

ANTH 383. *Introduction to Medical Anthropology (3)

ANTH 442/ANTH 542. Biocultural Perspectives on Human Biology (4)

ANTH 449/ANTH 549. Biocultural Perspectives on Human Reproduction (4)
 ANTH 474/ANTH 574. Cross-Cultural Health and Healing (4)
 ANTH 483/ANTH 583. Advanced Medical Anthropology (4)
 BB 331. *Introduction to Molecular Biology (3)
 BB 332. *Molecular Medicine (3)
 BI 300/ENT 300/HORT 330. *Plagues, Pests and Politics (3)
 BI 301. *Human Impacts on Ecosystems (3)
 ENG 489/ENG 589. Writing, Literature and Medicine (4)
 ES 445. *Native American Science and Technology (3)
 EXSS 312. *Sociocultural Dimensions of Physical Activity (3)
 H 100. Introduction to Public Health (4)
 H 210. *Introduction to the Health Care System (3)
 H 225. *Social and Individual Health Determinants (4)
 H 312. *AIDS and Sexually Transmitted Diseases in Modern Society (3)
 H 320. Introduction to Human Disease (3)
 H 344. Foundations of Environmental Health (3)
 HDFS 447/HDFS 547. *Families and Poverty (4)
 HSTS 415/HSTS 515. *Theory of Evolution and Foundation of Modern Biology (4)
 HSTS 416/HSTS 516. *History of Medicine Pre-1800 (4)
 HSTS 417/HSTS 517. *History of Medicine (4)
 HSTS 419/HSTS 519. *Studies in Scientific Controversy: Methods and Practices (4)
 HSTS 423/HSTS 523. *Science and Religion (4)
 HSTS 437/HSTS 537. *History of Animals in Science (4)
 HSTS 440/HSTS 540. *History of Psychotherapy (4)
 NUTR 240. Human Nutrition (3)
 NUTR 312. *Issues in Nutrition and Health (3)
 PHAR 210. Terminology of the Health Sciences (2)
 PHL/HC 299. Selected Topics: *The Art of Healing* (2)
 PHL 440/PHL 540. Environmental Ethics (3)
 PHL 444/PHL 544. *Biomedical Ethics (4)
 PHL 455/PHL 555. Death and Dying (3)
 PHL 474/PHL 574. *Philosophy of Biology (4)
 PSY 498/PSY 598. Health Psychology (4)
 SOC 350. Health, Illness and Society (4)
 SOC 355. Death and Dying (3)
 SOC 432/SOC 532. Sociology of Aging (3)
 WGSS 270. Violence Against Women (3)
 WGSS 340. *Gender and Science (3)
 WGSS 350. *Politics of Motherhood in a Global Context (3)
 WGSS 465/WGSS 565. Women, Weight and Body Image (3)
 WGSS 466/WGSS 566. *Fat Studies (3)
 WGSS 482/WGSS 582. Global Perspectives on Womens' Health (3)

Total = 27 Credits

Footnotes:

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

PEACE STUDIES CERTIFICATE

Joseph A. Orosco, Director

102D Hovland Hall
 Oregon State University
 Corvallis, OR 97331-3902
 541-737-4335

Email: joseph.orosco@oregonstate.edu
 Website: <http://oregonstate.edu/cla/philosophy/peace-studies-certificate>

To earn the Peace Studies certificate, students must complete a minimum of 30 credits consisting of 12 credits from the PAX core courses and 18 credits of elective courses.

For more information, contact Joseph Orosco, 541-737-4335, email: joseph.orosco@oregonstate.edu

PAX Core Requirements (12)

PAX 201. Study of Peace and the Causes of Conflict (3)

Plus at least 9 credits from the following:

ANTH 380. *Cultures in Conflict (3)
 COMM 440/COMM 540. Theories of Conflict and Conflict Management (3)
 HST 317. *Why War: A Historical Perspective (4)
 PHL 344. *Pacifism, Just War, and Terrorism (4)
 PS 205. *Introduction to International Relations (4)

PAX Electives (18 credits from areas listed below):

1. Peace, Research and Practice
2. Communication and Peace
3. Cultures and Peace
4. Economics and Peace
5. Ethics and Peace
6. History and Peace
7. Inequality and Peace
8. Politics and Peace

Footnote:

* Baccalaureate Core Course

RELIGION AND CULTURE CERTIFICATE

The Religion and Culture undergraduate certificate is designed to provide undergraduate students with both breadth and depth in the academic study of religion, with a focus on how religious practice and ideas are manifested as both a shaper and critic of broader cultures nationally and globally.

The certificate is open to all OSU undergraduates as a supplement to any undergraduate degree program. It builds on a core curriculum of courses in the study of religion in the School of History, Philosophy, and Religion and extends student learning to courses in religion and culture, diversity, literature, and western religious experience in many other academic units. The certificate is recognized with a transcript-visible notation.

For advising, contact David Bishop, Academic Coordinator, School of History, Philosophy, and Religion, 322B Milam

Hall, 541-737-8918, David.Bishop@oregonstate.edu.

Required Core (8):

PHL 160. *Quests for Meaning: World Religions (4)
 PHL 202. Introduction to Religious Studies (4)

Religion and Culture Electives (10): Select from the following courses:

HST 387. *Islamic Civilization (4)
 HST 388. *Islamic Civilization (4)
 HST 425/HST 525. *The Holocaust in its History (4)
 PHL 170. *The Idea of God (4)
 PHL 208. Introduction to Buddhist Traditions (4)
 PHL/HST 210. *Religion in the United States (4)
 PHL 213. *Introduction to Hindu Traditions (4)
 PHL 214. *Introduction to Islamic Traditions (4)
 PHL 220. *World-Views and Values in the Bible (4)
 PHL 312. *Asian Thought (4)
 PHL 315. *Gandhi and Nonviolence (3)
 PHL 344. *Pacifism, Just War, Terrorism (4)
 PHL 371. *Philosophies of China (4)
 PHL 430/PHL 530. History of Buddhist Philosophy (4)
 PHL 431/PHL 531. Buddhism, Non-Violence and Social Justice (4)
 PHL 432/PHL 532. *Yoga and Tantric Traditions (4)
 PHL 436/PHL 536. Philosophy and Religion (3)
 PHL 443/PHL 543. *World Views and Environmental Values (3)
 PHL 448/PHL 548. Native American Philosophies (3)
 or ES 448/ES 548. Native American Philosophies (3)
 PHL 455/PHL 555. Death and Dying (3)

Interdisciplinary Electives (9): Select from the following courses:

ANTH 110. *Introduction to Cultural Anthropology (3)
 ANTH 452. Folklore and Expressive Culture (4)
 ANTH 472. Contemporary Indian Issues (4)
 ART 204. *Introduction to Art History - Western (3)
 ART 205. *Introduction to Art History - Western (3)
 ART 206. *Introduction to Art History - Western (3)
 ART 208. *Introduction to Asian Art (3)
 ENG 215. *Classical Mythology (4)
 ENG 275. *The Bible as Literature (4)
 ENG 330. *The Holocaust in Literature and Film (4)
 ENG 360. *Native American Literature (4)
 HST 333. Medieval and Early Modern Spanish History (4)
 HST 390. *Mideast Women: In Their Own Words (4)
 HST 485/HST 585. *Politics and Religion in the Modern Middle East (4)
 HSTS 423/HSTS 523. *Science and Religion (4)
 NMC 437. New Media and Society (3)
 PAX 201. Study of Peace and the Causes of Conflict (3)

PS 204. *Introduction to Comparative Politics (4)
 PS 361. Classical Political Thought (4)
 SOC 205. *Institutions and Social Change (3)
 SOC 452/SOC 552. Sociology of Religion (4)
 WGSS 223. *Women: Self and Society (3)
 WGSS 380. *Muslim Women (3)
 WGSS 420/WGSS 520. *Hate, Resistance, and Reconciliation (3)
 WGSS 495/WGSS 595. *Global Feminist Theologies (3)
 WGSS 496/WGSS 596. *Feminist Theologies in the United States (3)

Total=27 credits minimum

Footnotes

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

■ HISTORY COURSES

HST 101. *HISTORY OF WESTERN CIVILIZATION (4). Provides an awareness and understanding of the Western cultural heritage. Stresses the major ideas and developments that have been of primary importance in shaping the Western tradition. Covers the Ancient World to 1000 A.D. HST 101, HST 102 and HST 103 need not be taken in sequence. (H) (SS) (Bacc Core Course)

HST 101H. *HISTORY OF WESTERN CIVILIZATION (4). Provides an awareness and understanding of the Western cultural heritage. Stresses the major ideas and developments that have been of primary importance in shaping the Western tradition. Covers the Ancient World to 1000 A.D. HST 101H, HST 102H and HST 103H need not be taken in sequence. (H) (SS) (Bacc Core Course) **PREREQS:** Honors College approval required.

HST 102. *HISTORY OF WESTERN CIVILIZATION (4). Provides an awareness and understanding of the Western cultural heritage. Stresses the major ideas and developments that have been of primary importance in shaping the Western tradition. Covers 1000 A.D. to 1789. HST 101, HST 102 and HST 103 need not be taken in sequence. (H) (SS) (Bacc Core Course)

HST 102H. *HISTORY OF WESTERN CIVILIZATION (4). Provides an awareness and understanding of the Western cultural heritage. Stresses the major ideas and developments that have been of primary importance in shaping the Western tradition. Covers 1000 A.D. to 1789. HST 101H, HST 102H and HST 103H need not be taken in sequence. (H) (SS) (Bacc Core Course) **PREREQS:** Honors College approval required.

HST 103. *HISTORY OF WESTERN CIVILIZATION (4). Provides an awareness and understanding of the Western cultural heritage. Stresses the major ideas and developments that have been of primary importance in shaping the Western tradition. Covers 1789 to the present. HST 101, HST 102 and HST 103 need not be taken in sequence. (H) (SS) (Bacc Core Course)

HST 103H. *HISTORY OF WESTERN CIVILIZATION (4). Provides an awareness and understanding of the Western cultural heritage. Stresses the major ideas and developments that have been of primary importance in shaping the Western tradition. Covers 1789 to present. HST 101H, HST 102H, and HST 103H need not be taken in sequence. (H) (SS) (Bacc Core Course) **PREREQS:** Honors College approval required.

HST 104. *WORLD HISTORY I: ANCIENT CIVILIZATIONS (3). A survey of the historical development of several world civilizations from antiquity to roughly 600 to 700 A.D. Exploration of religious, cultural, social, political, and economic institutions of various societies. Cultural diversity analysis of both ancient Western and non-Western civilizations. Not offered every year. (H) (Bacc Core Course)

HST 105. *WORLD HISTORY II: MIDDLE AND EARLY MODERN AGES (3). A survey of the historical development of several world civilizations roughly from the 8th century to the late 18th century. Exploration of religious, cultural, social, political, and economic institutions of various societies. Cultural diversity analysis of both ancient Western and non-Western civilizations. Not offered every year. (H) (Bacc Core Course)

HST 106. *WORLD HISTORY III: THE MODERN AND CONTEMPORARY WORLD (3). A survey of the historical development of several world civilizations from the 18th century to the contemporary period. Exploration of religious, cultural, social, political, and economic institutions of various societies. Cultural diversity analysis of both ancient Western and non-Western civilizations. Not offered every year. (H) (Bacc Core Course)

HST 199. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 16 credits.

HST 201. *HISTORY OF THE UNITED STATES (4). Provides an overview of the development of the U.S. from the pre-Columbian era to the present. Attention is given to economic, political, and social trends, as well as to international relations. Covers pre-Columbian and colonial origins to 1820. HST 201, HST 202, HST 203 need not be taken in sequence. (H) (SS) (Bacc Core Course)

HST 201H. *HISTORY OF THE UNITED STATES (4). Provides an overview of the development of the U.S. from the pre-Columbian era to the present. Attention is given to economic, political, and social trends, as well as to the international relations. Covers pre-Columbian and colonial origins to 1820. HST 201H, HST 202H, and HST 203H need not be taken in sequence. (H) (SS) (Bacc Core Course) **PREREQS:** Honors College approval required.

HST 202. *HISTORY OF THE UNITED STATES (4). Provides an overview of the development of the U.S. from the pre-Columbian era to the present. Attention is given to economic, political, and social trends, as well as to international relations. Covers 1820 to 1920. HST 201, HST 202, HST 203 need not be taken in sequence. (H) (SS) (Bacc Core Course)

HST 202H. *HISTORY OF THE UNITED STATES (4). Provides an overview of the development of the U.S. from the pre-Columbian era to the present. Attention is given to economic, political, and social trends, as well as to international relations. Covers 1820 to 1920. HST 201H, HST 202H, and HST 203H need not be taken in sequence. (H) (SS) (Bacc Core Course) **PREREQS:** Honors College approval required.

HST 203. *HISTORY OF THE UNITED STATES (4). Provides an overview of the development of the U.S. from the pre-Columbian era to the present. Attention is given to economic, political, and social trends, as well as to international relations. Covers 1920 to present. HST 201, HST 202, HST 203 need not be taken in sequence. (H) (SS) (Bacc Core Course)

HST 203H. *HISTORY OF THE UNITED STATES (4). Provides an overview of the development of the U.S. from the pre-Columbian era to the present. Attention is given to economic, political, and social trends, as well as to international relations. Covers 1920 to present. HST 201H, HST 202H, and HST 203H need not be taken in sequence. (H) (SS) (Bacc Core Course) **PREREQS:** Honors College approval required.

HST 210. *RELIGION IN THE UNITED STATES (4). A thematic overview of the historical study of religion in the United States, with an eye toward ways that social and cultural contexts have shaped the religious experience of Americans in different places and times. Surveys a wide array of religious movements, groups, and individuals from the colonial period to present. CROSSLISTED as PHL 210. (Bacc Core Course)

HST 210H. *RELIGION IN THE UNITED STATES (4). A thematic overview of the historical study of religion in the United States, with an eye toward ways that social and cultural contexts have shaped the religious experience of Americans in different places and times. Surveys a wide array of religious movements, groups, and individuals from the colonial period to present. CROSSLISTED as PHL 210H. (Bacc Core Course) **PREREQS:** Honors College approval required.

HST 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

HST 310. THE HISTORIAN'S CRAFT (4). A study of the practice as well as theory of historical work. Combines training in reading, writing, and thinking historically with a survey of the development of history, philosophies of history, types and use of historical evidence, varieties of historical investigation, and factors that influence the writing of history. (H) **PREREQS:** 9 credits of history or upper-division standing.

HST 315. THE EUROPEAN MILITARY, 1400-1815 (4). Major aspects of European military history, 1400-1815, notable developments in weaponry and strategy, the social history of the military, impact of war on the civilian front, and pacifism and antimilitarism. Not offered every year. (H)

HST 316. THE AMERICAN MILITARY, 1607-1865 (4). Major aspects of American military history, 1607-1865, notable developments in weaponry and strategy, the social history of the military, impact of war on the civilian front, and pacifism and antimilitarism. Not offered every year. (H)

HST 317. *WHY WAR: A HISTORICAL PERSPECTIVE (4). An inquiry into the origins of mass violence. Theory and case studies are used to suggest possible causes of international war, civil war, revolution, and genocide. (H) (Bacc Core Course)

HST 318. THE AMERICAN MILITARY, 1865-PRESENT (4). Major aspects of American military history, 1865-present: evolution of strategy, tactics, and technology in war; the impact of the military on American society in peace and war; historiographic aspects of U.S. military history. Not offered every year. (H)

HST 320. *ANCIENT NEAR EAST (4). A detailed survey of the peoples and cultures of the ancient Near East, including Assyria, Babylon, Egypt, Israel, Mesopotamia, and Persia, from the earliest recorded beginnings of civilization to about 500 B.C. Particular attention is given to the art, religion, law, and literature of these civilizations. (H) (NC) (Bacc Core Course)

HST 321. GREECE (4). The history of the Greek city-states and the civilization they produced; the archaeological discovery of early Greece; the development of the polis; Sparta, Athenian democracy, the Persian and Peloponnesian Wars; Greek private life and religion. (H)

HST 322. ROMAN REPUBLIC (4). The rise of Rome from a city-state to a world power, Rome's wars with Carthage, her growing domination of the Mediterranean, the ensuing breakdown of Roman society and traditional values, and the rise of ambitious leaders who ultimately destroyed the Republic. (H)

HST 323. ROMAN EMPIRE (4). Roman history from 31 B.C. to A.D. 493. The establishment of the Principate, Roman social and private life, the rise of Christianity, the decline and fall of the Western Empire, Rome's contributions to arts, religion, and law. Not offered every year. (H)

HST 327. HISTORY OF MEDIEVAL EUROPE (4). Cultural, political, and economic history of the European Middle Ages from the fall of the Roman Empire in the West to the Renaissance. Covers 284 A.D. to 1000. HST 327 and HST 328 need not be taken in sequence. Not offered every year. (H)

HST 328. HISTORY OF MEDIEVAL EUROPE (4). Cultural, political, and economic history of the European Middle Ages from the fall of the Roman

Empire in the West to the Renaissance. Covers 1000 to 1400. HST 327 and HST 328 need not be taken in sequence. Not offered every year. (H)

HST 329. HISTORY OF EARLY MODERN EUROPE (4). Political, social, intellectual, and cultural history of Europe from 1400-1789. Focuses on the Renaissance. HST 329, HST 330, and HST 331 need not be taken in sequence. Not offered every year. (H)

HST 330. HISTORY OF EARLY MODERN EUROPE (4). Political, social, intellectual, and cultural history of Europe from 1400-1789. Focuses on the Reformation. HST 329, HST 330, and HST 331 need not be taken in sequence. Not offered every year. (H)

HST 331. HISTORY OF EARLY MODERN EUROPE (4). Political, social, intellectual, and cultural history of Europe from 1400-1789. Focuses on the scientific revolution. HST 329, HST 330, and HST 331 need not be taken in sequence. Not offered every year. (H)

HST 333. MEDIEVAL AND EARLY MODERN SPANISH HISTORY (4). From Islamic conquest to conquest of America, the social, religious, political and economic history of Spain from 1000 to 1700. Not offered every year. (H)

HST 335. NINETEENTH-CENTURY EUROPE (4). A thematic overview of the "long" nineteenth century, from the French Revolution (1789) to the outbreak of the first World War (1914): the industrial revolution and the class struggles that accompanied it; the growing importance of the nation in politics and culture; imperial expansion and Europeans' contacts with non-Europeans; psychoanalysis and the new sciences of the mind; and the developments leading to the cataclysm of Europe's first "modern" war. Not offered every year. (H)

HST 336. TWENTIETH-CENTURY EUROPE (4). Examines the politics, culture, and society of Europe from World War I to the present. Themes include total war; ways that art and literature influenced politics; communist and fascist visions of the relationship of the individual to the society or collective; racial theories and genocide; the cold war division of Europe into East and West; decolonization; and the development of the European Community. Not offered every year. (H)

HST 340. HISTORY OF RUSSIA (4). Survey of political, economic, and social developments from the origin of Russia to the post-Soviet period. Focuses on the period from 862 to 1917. Not offered every year. HST 340 and HST 341 need not be taken in sequence. (H)

HST 341. HISTORY OF RUSSIA (4). Survey of political, economic, and social developments from the origin of Russia to the post-Soviet period. Focuses on the period from 1917 to the present. Not offered every year. HST 340 and HST 341 need not be taken in sequence. (H)

HST 344. SPECIAL TOPICS IN RUSSIAN HISTORY (4). Special topics and problems in Russian history not covered in other courses. May be repeated when topic varies. Not offered every year. (H) This course is repeatable for a maximum of 8 credits.

HST 345. SOCIETY IN MODERN RUSSIA (4). Development of Russian/Soviet/Post-Soviet society since 1861, focusing on gender, urbanization, and the general social ramifications of modernization. Not offered every year. (H)

HST 350. *MODERN LATIN AMERICA (4). History of Latin America leading up to and after Spanish and Portuguese conquest. Focus on indigenous American, European and African cultures and religions in contact under colonial government and economic systems. Covers the period from 1400 to 1810. HST 350 and HST 351 need not be taken in sequence. (H) (NC) (Bacc Core Course)

HST 350H. *MODERN LATIN AMERICA (4). History of Latin America leading up to and after Spanish and Portuguese conquest. Focus on indigenous American, European and African cultures and religions in contact under colonial government and economic systems. Covers the period from 1400 to 1810. HST 350H and HST 351H need not be taken in sequence. (H) (NC) (Bacc Core Course) **PREREQS:** Honors College approval required.

HST 351. *MODERN LATIN AMERICA (4). History of the development of Latin America, emphasizing the issues of imperialism, economic dependency, social stratification, political instability, and nationalism within an international context. Covers 1850 to the present. (H) (NC) (Bacc Core Course) **PREREQS:** HST 350 and HST 351 need not be taken in sequence.

HST 351H. *MODERN LATIN AMERICA (4). History of the development of Latin America, emphasizing the issues of imperialism, economic dependency, social stratification, political instability, and nationalism within an international context. Covers 1850 to the present. (H) (NC) (Bacc Core Course) **PREREQS:** HST 350 and HST 351 need not be taken in sequence. Honors College approval required.

HST 352. *AFRICANS IN LATIN AMERICAN HISTORY (4). A survey of the role of Africans and their descendants in Latin American history, linking the history of the Americas, Europe and Africa. (Baccalaureate Core Course) **PREREQS:** HST 350 and HST 351 suggested.

HST 362. WOMEN IN UNITED STATES HISTORY (4). Women in the United States--their roles in and contribution to American political, economic, social, cultural, and intellectual life. Course sequence pays particular attention to the diversity of American women's backgrounds and experiences. Covers 1620 to 1890. Not offered every year. HST 362 and HST 363 need not be taken in sequence. (H)

HST 363. WOMEN IN UNITED STATES HISTORY (4). Women in the United States--their roles in and contribution to American political, economic, social, cultural, and intellectual life. Course sequence pays particular attention to the diversity of American women's backgrounds and experiences. Covers 1890 to the present. Not offered every year. HST 362 and HST 363 need not be taken in sequence. (H)

HST 365. THE CIVIL RIGHTS MOVEMENT IN THE MODERN U.S. (4). An exploration of the "long civil rights movement" among African Americans and their allies during the 20th century United States, with attention to the structure of racial inequality, movement philosophies and strategies, white allies and opponents, relationships to other freedom movements, and the movement's legacies. (Bacc Core Course)

HST 366. HISTORY OF THE AMERICAN INDIAN (4). A study of the American Indian north of Mexico from before European contact to the present. Focuses on the indigenous population prior to European contact; initial alterations in and continued disruption of Indian society and culture; Indian-white conflict; emergence of U.S. Government Indian policy to 1848. Not offered every year. (H)

HST 368. *LESBIAN AND GAY MOVEMENTS IN MODERN AMERICA (4). Examination of lesbian and gay male identities, lives, and collectivities in American culture from the post-Civil War period to the present. The political and cultural participation, rather than human sexual behaviors, orientations, or values. Not offered every year. (H) (Bacc Core Course)

HST 369. *^IMMIGRATION TO THE U.S. SINCE 1880 (4). The history of immigrants to the U.S. after 1880. Focuses on the experience of immigrants and their children in the U.S. and on the history of U.S. immigration policy. Includes several types of writing assignments: nongraded,

drafts and revisions, and a research paper using outside primary and secondary sources and scholarly notations specific to the discipline of history. HST 369 satisfies WIC requirement for Liberal Studies majors but not History majors. (Baccalaureate Core Course) (Writing Intensive Course) Taught via Ecampus only.

HST 370. *SOCIAL CHANGE AND AMERICAN POPULAR MUSIC (4). An examination of the interactions between social history and popular music, including creation, performance, production, distribution, and reception. Social, ethnic, and economics groups have notoriously used popular music to identify themselves and their boundaries. This course examines how the functions of popular music in our culture and economy have changed over time, and the ways in which popular music reflects and sometimes helps precipitate social change. (Bacc Core Course)

HST 381. *HISTORY OF AFRICA (4). History of Africa from earliest times to present, including origins of human society, slave trade, European imperialism and African nationalism. Covers Africa before 1830. HST 381 and HST 382 need not be taken in sequence. (H) (NC) (Bacc Core Course)

HST 382. *HISTORY OF AFRICA (4). History of Africa from earliest times to present, including origins of human society, slave trade, European imperialism and African nationalism. Covers Nineteenth and Twentieth century Africa. HST 381 and HST 382 need not be taken in sequence. (H) (NC) (Bacc Core Course)

HST 385. *THE ARAB-ISRAELI CONFLICT (4). Examination of the origins of the Arab-Israeli conflict and subsequent efforts to find a lasting solution. (H) (Bacc Core Course)

HST 386. *MODERN IRAN: REVOLUTION AND ITS AFTERMATH (4). The history of 20th century Iran with a focus on the Islamic revolution and its consequences. Readings will provide the cultural and political background for understanding contemporary Iran and its place in the world. (Bacc Core Course)

HST 386H. *MODERN IRAN: REVOLUTION AND ITS AFTERMATH (4). The history of 20th century Iran with a focus on the Islamic revolution and its consequences. Readings will provide the cultural and political background for understanding contemporary Iran and its place in the world. (Bacc Core Course) **PREREQS:** Honors College approval required.

HST 387. *ISLAMIC CIVILIZATION (4). Political, social, and religious developments from 600 to 1400. Early history and the formation of Islamic society to the Mongol invasion. HST 387 and HST 388 need not be taken in sequence. (H) (NC) (Bacc Core Course)

HST 388. *ISLAMIC CIVILIZATION (4). Political, social, and religious developments from 1400 to the present. The expansion of Islam, Turkic, and Asian dynasties, impact of Western imperialism and modern Islamic world. HST 387 and HST 388 need not be taken in sequence. (H) (NC) (Bacc Core Course)

HST 390. *MIDEAST WOMEN: IN THEIR OWN WORDS (4). The lives of modern Middle Eastern women as told in memoirs, autobiography and film. First-person narratives and film portrayals provide the means for understanding historical events and contemporary trends in the region. (Bacc Core Course)

HST 390H. *MIDEAST WOMEN: IN THEIR OWN WORDS (4). The lives of modern Middle Eastern women as told in memoirs, autobiography and film. First-person narratives and film portrayals provide the means for understanding historical events and contemporary trends in the region. (Bacc Core Course) **PREREQS:** Honors College approval required.

HST 391. *TRADITIONAL CHINA AND JAPAN (4). Prehistory to Western encounters in the middle of the nineteenth century, with emphasis

on the philosophical, artistic heritage, and social institutions of these two countries which form East Asia. HST 391 and HST 392 need not be taken in sequence. (H) (NC) (Bacc Core Course)

HST 392. *MODERN CHINA AND JAPAN (4). From the opening of East Asia in the mid-nineteenth century to the present, with emphasis on modern political movements and cultural transformation. HST 391 and HST 392 need not be taken in sequence. (H) (NC) (Bacc Core Course)

HST 396. *GENDER, FAMILY AND POLITICS IN TRADITIONAL CHINA (4). Study of the interaction between gender, family and politics as major factors shaping traditional Chinese experience. (Bacc Core Course)

HST 397. *GENDER, FAMILY AND POLITICS IN MODERN CHINA (4). Study of the interaction between gender, family and politics as three factors shaping modern Chinese experience. Elective for history majors. (Bacc Core Course)

HST 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

HST 399H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

HST 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

HST 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

HST 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

HST 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

HST 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

HST 407. *SEMINAR (5). (Writing Intensive Course) This course is repeatable for a maximum of 20 credits.

HST 410. HISTORY INTERNSHIP (1-12). Supervised work of a historical nature with historical societies, archives, museums, or other public or private organizations. No more than 6 of the maximum 12 credits may be used to satisfy the history major requirement of 51 credits. This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

HST 415. SELECTED TOPICS (4). Selected topics of special or current interest not covered in other courses. (H) This course is repeatable for a maximum of 99 credits.

HST 415H. SELECTED TOPICS (4). Selected topics of special or current interest not covered in other courses. (H) This course is repeatable for a maximum of 99 credits. **PREREQS:** Honors College approval required.

HST 416. FOOD IN WORLD HISTORY (4). Historical analysis of food and cooking from pre-history to the present, with an emphasis on cross-cultural differences of food production and consumption.

HST 421. HELLENISTIC GREECE (4). History of the Greek world from the end of the Peloponnesian War to the Roman conquest of Greece; the careers of Alexander the Great and his successors; the art, literature, science, religion, and philosophy of the post-classical or Hellenistic world. Not offered every year. (H)

HST 425. *THE HOLOCAUST IN ITS HISTORY (4). An inquiry into the causes, course, and impact of the Holocaust. The general theme of anti-Semitism in European history is explored for background. Topics discussed for comparative

purposes include anti-Semitism in American history; other episodes of mass murder in the 20th century. Not offered every year. (H) (Bacc Core Course)

HST 425H. *THE HOLOCAUST IN ITS HISTORY (4). An inquiry into the causes, course, and impact of the Holocaust. The general theme of anti-Semitism in European history is explored for background. Topics discussed for comparative purposes include anti-Semitism in American history; other episodes of mass murder in the 20th century. Not offered every year. (Bacc Core Course) **PREREQS:** Honors College approval required.

HST 426. WORLD WAR I: A GLOBAL HISTORY (4). Examines World War I from a global perspective, its origins, the course of the conflict and its aftermath, looking especially at Great Britain, France, Russia, Germany and their colonial possessions. Topics will include the concept of total war and the home fronts of a number of nations. **PREREQS:** HST 103

HST 427. TEACHING THE HOLOCAUST (4). Provides a broad sense of the Holocaust; reviews the event itself, its long-term background (the history of anti-Semitism), and the rise of Nazism and Fascism in the years before World War II. Examines what has been learned from the Holocaust and addresses the broader issue of genocide, especially in the 20th century. "Teaching the Holocaust" is directed toward certified teachers and students preparing for teaching careers. Lectures are delivered online. Course includes a day-long set of workshops that deal with issues associated with teaching the Holocaust and genocide.

HST 428. HISTORY OF WESTERN THOUGHT (4). A synthesis of major developments in philosophy, science, social, and political theory and the arts in the European Enlightenment (1715-1789). Not offered every year. HST 428, HST 429, HST 430 need not be taken in sequence. (H)

HST 429. HISTORY OF WESTERN THOUGHT (4). A synthesis of major developments in philosophy, science, social, and political theory and the arts between 1789 and 1890. Not offered every year. HST 428, HST 429, HST 430 need not be taken in sequence.

HST 430. HISTORY OF WESTERN THOUGHT (4). A synthesis of major developments in philosophy, science, social, and political theory and the arts between 1890 and 1945. Not offered every year. HST 428, HST 429, HST 430 need not be taken in sequence. (H)

HST 432. THE HISTORY OF SEXUALITY (4). The history of human sexuality from ancient Greece to the present. (H) (SS)

HST 432H. HISTORY OF SEXUALITY (4). The history of human sexuality from ancient Greece to the present. (H) (SS) **PREREQS:** Honors College approval required.

HST 433. ENGLISH HISTORY (4). The major political, cultural, economic, social and religious developments that have shaped the history of England and ultimately of America and much of the world. Medieval and Tudor-Stuart England. HST 433/HST 533, HST 434/HST 534 need not be taken in sequence. Not offered every year. (H)

HST 434. ENGLISH HISTORY (4). The major political, cultural, economic, social and religious developments that have shaped the history of England and ultimately of America and much of the world. England since 1688. HST 433/HST 533, HST 434/HST 534 need not be taken in sequence. Not offered every year. (H)

HST 435. THE HISTORY OF EUROPEAN WOMEN FROM 1400 TO 1789 (4). Focuses on the social, economic, and cultural roles women in Europe between 1400 and 1789. Topics include Christianity and women, the Renaissance lady, the European witch craze, women rulers,

the debate about female intellectual abilities, and the beginning of the campaign for female equality. **PREREQS:** HST 102 and HST 103 recommended.

HST 436. HISTORY OF MODERN GERMANY (4). Political, economic, social and intellectual developments from 1815 through the imperial, Weimar, and Nazi eras to the present. Not offered every year. (H)

HST 438. THE WILL AND THE SELF (4). A seminar on three major figures of nineteenth-century German intellectual history: Arthur Schopenhauer, Friedrich Nietzsche, and Robert Musil. The central theme is the emergence of philosophical irrationalism, a distinctive view of human nature that developed in the context of modern science from Newton to Darwin to Einstein.

HST 452. MODERN MEXICO (4). History of Mexico since 1810--economic, political, and social change and relations with the United States. Not offered every year. (H) **PREREQS:** HST 350 or HST 351 or upper-division standing.

HST 456. PROBLEMS IN LATIN AMERICAN HISTORY (4). A focused examination of the origins and development of selective institutions and problems important to understanding the region, such as the church, the military, labor, political instability, economic stagnation, and social stratification. (H) **PREREQS:** HST 350 or HST 351 or upper-division standing.

HST 460. AMERICAN THOUGHT AND CULTURE (4). An examination of the main currents of American thought and culture, emphasizing ideas and concepts that have influenced the development and growth of American institutions and values from 1776 to 1860. Not offered every year. HST 460/HST 560, HST 461/HST 561, HST 462/HST 562 need not be taken in sequence. (H) **PREREQS:** HST 201 and HST 202 and HST 203 or upper-division standing.

HST 461. AMERICAN THOUGHT AND CULTURE (4). An examination of the main currents of American thought and culture, emphasizing ideas and concepts that have influenced the development and growth of American institutions and values from 1860 to 1930. HST 460/HST 560, HST 461/HST 561, HST 462/HST 562 need not be taken in sequence. Not offered every year. (H) **PREREQS:** HST 201 and HST 202 and HST 203 or upper-division standing.

HST 462. AMERICAN THOUGHT AND CULTURE (4). An examination of the main currents of American thought and culture, emphasizing ideas and concepts that have influenced the development and growth of American institutions and values from 1930 to the present. HST 460/HST 560, HST 461/HST 561, HST 462/HST 562 need not be taken in sequence. Not offered every year. (H) **PREREQS:** HST 201 and HST 202 and HST 203 or upper-division standing.

HST 464. AMERICAN DIPLOMATIC HISTORY (4). American diplomatic relations from the nation's founding to 1898. HST 464/HST 564 and HST 465/HST 565 need not be taken in sequence. Not offered every year. (H) **PREREQS:** HST 201 and HST 202 and HST 203 or upper-division standing.

HST 465. *AMERICAN DIPLOMATIC HISTORY (4). American diplomatic relations from 1898 to the present. HST 464/HST 564 and HST 465/HST 565 need not be taken in sequence. Not offered every year. (H) (Bacc Core Course) **PREREQS:** HST 201 and HST 202 and HST 203 or upper-division standing.

HST 465H. *AMERICAN DIPLOMATIC HISTORY (4). American diplomatic relations from 1898 to the present. HST 464/HST 564 and HST 465/HST 565 need not be taken in sequence. Not offered every year. (H) (Bacc Core Course) **PREREQS:** HST 201 and HST 202 and HST 203 or upper-division standing. Honors College approval required.

HST 467. HISTORY OF THE AMERICAN WEST (4). Important themes in the transformation of western America from the pre-industrial world of native Americans to the emergence of the region as a major force in the cultural, economic, and political life of the United States. HST 467/HST 567 and HST 468/HST 568 need not be taken in sequence. Not offered every year. (H) **PREREQS:** HST 201 and HST 202 and HST 203 or upper-division standing.

HST 468. HISTORY OF THE AMERICAN WEST (4). Important themes in the transformation of western America from the pre-industrial world of native Americans to the emergence of the region as a major force in the cultural, economic, and political life of the United States. HST 467/HST 567 and HST 468/HST 568 need not be taken in sequence. Not offered every year. (H) **PREREQS:** HST 201 and HST 202 and HST 203 or upper-division standing.

HST 469. HISTORY OF THE PACIFIC NORTHWEST (4). The demographic, ecological, and cultural transformation of Oregon, Washington, and Idaho from Indian times to the present. Not offered every year. (H) **PREREQS:** HST 201 and HST 202 and HST 203 or upper-division standing.

HST 471. COLONIAL AMERICA (4). Economic, political, social, religious, and intellectual development of colonial North America from the English background to 1689. HST 471/HST 571, HST 472/572 need not be taken in sequence. Not offered every year. (H) **PREREQS:** HST 201 or upper-division standing.

HST 472. COLONIAL AMERICA (4). Economic, political, social, religious, and intellectual development of colonial North America from 1689 to 1763. HST 471/HST 571, HST 472/572 need not be taken in sequence. Not offered every year. (H) **PREREQS:** HST 201 or upper-division standing.

HST 473. THE ERA OF THE AMERICAN REVOLUTION (4). The American Revolution, the drafting of the Constitution, and the launching of the new nation, 1763 to 1789. Not offered every year. (H) **PREREQS:** HST 201 or upper-division standing.

HST 474. JEFFERSONIAN AND JACKSONIAN DEMOCRACY (4). American political, economic, religious, and social development during the early and middle national era with emphasis on the formation and growth of political parties, territorial expansion and western settlement, and the beginnings of sectional conflict. Not offered every year. (H) **PREREQS:** HST 201 and HST 202 or upper-division standing.

HST 475. CIVIL WAR AND RECONSTRUCTION (4). Origins of the war, nature of the war, and the critical postwar era, 1830s to 1880s, with special attention to the changing historiography of the period. Not offered every year. (H) **PREREQS:** HST 202 or upper-division standing.

HST 477. THE PROGRESSIVE AND NEW DEAL ERAS (4). Twentieth-century U.S. history from 1900 to 1939, with emphasis on political and economic developments; attention given to diplomatic, cultural, and social change. Not offered every year. (H) **PREREQS:** HST 203

HST 478. THE UNITED STATES SINCE 1939 (4). United States political, cultural, and diplomatic history from the Second World War through the 1970s, with special emphasis on the Cold War at home and abroad. Not offered every year. (H) **PREREQS:** HST 203 or upper-division standing.

HST 481. *ENVIRONMENTAL HISTORY OF THE UNITED STATES (4). A study of human interaction with the environment and the transformation of the landscape and ecology of North America from the Indian period to the present, with special attention to the progressive alterations induced by the modernizing world of agriculture, industry, urbanism, and their relation to the market system in the United States. Not

offered every year. (H) (Bacc Core Course) **PREREQS:** Upper-division standing. HST 201, HST 202, HST 203 are recommended.

HST 485. *POLITICS AND RELIGION IN THE MODERN MIDDLE EAST (4). The role of religious and secular ideologies in the politics of the 20th century Middle East. Topics include the impact of liberal and nationalist thought, the Iranian revolution, radical Islamist movements, and Zionism. (H) (NC) (Bacc Core Course) **PREREQS:** Upper-division standing or instructor approval required.

HST 486. A HISTORY OF CHRISTIANITY IN AFRICA (4). An investigation of the historical development and changing character of Christianity in Africa. Topics include the examination of the role of Christianity in the development of social identity and politics in historic Ethiopia from the early first millennium CE; Portuguese missionary efforts in Central Africa during the period of the Atlantic slave trade from the 15th to the 18th centuries; the role of 19th century missionaries in both spreading Christianity in Africa and during the European colonization of Africa at the end of the 19th century, the emergence of African independence churches and prophetic Christianity in the 20th century; and the "Africanization" of Christianity. (H) **PREREQS:** HST 381 and/or HST 382

HST 487. WORLD WAR II: A GLOBAL HISTORY (4). Examines World War II from a global perspective, its origins, the course of the conflict and its aftermath, looking especially at the US, USSR, Britain, Germany and Japan. Topics will include the concept of total war and the home fronts of a number of nations. **PREREQS:** HST 103

HST 488. *THE UNITED STATES AND VIETNAM 1945-1995 (4). Examines the Vietnam War from both the US and Vietnamese perspective within the context of the Cold War. Political, military, social and moral issues will be covered within the concept of American exceptionalism. (Bacc Core Course)

HST 494. MODERN JAPAN: A CULTURAL HISTORY (4). Japanese history from the Meiji to the contemporary period (1980s/1990s). Examination of Japanese tradition and the Tokugawa period. Investigation of Westernization/modernization, imperialism, national identity, gender, atomic bomb(s), and post-war culture. (H)

HST 495. CHINA IN THE TWENTIETH CENTURY (4). Treats the decline of the Confucian tradition, shifts in the economy, and metamorphoses of the political system. Attention is given to China's attempt to balance her Communistic revolutionary legacies with her current modernizing goals. (H) (NC) **PREREQS:** HST 391 and HST 392 or upper-division standing.

HST 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

HST 499H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

HST 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

HST 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

HST 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

HST 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

HST 507. SEMINAR (5). This course is repeatable for a maximum of 20 credits.

HST 510. HISTORY INTERNSHIP (1-12). Supervised work of a historical nature with historical societies, archives, museums, or other public or private organizations. No more than 6 of the maximum 12 credits may be used to satisfy the history major requirement of 51 credits. This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

HST 513. HISTORY OF SCIENCE (4). Stresses the interaction of scientific ideas with their social and cultural context. Development of modern science in the 18th and 19th centuries and to the present. HST 511, HST 512, HST 513 need taken in sequence. **PREREQS:** Graduate standing; at least one science sequence.

HST 515. SELECTED TOPICS (4). Selected topics of special or current interest not covered in other courses. This course is repeatable for a maximum of 16 credits.

HST 516. FOOD IN WORLD HISTORY (4). Historical analysis of food and cooking from pre-history to the present, with an emphasis on cross-cultural differences of food production and consumption.

HST 521. HELLENISTIC GREECE (4). History of the Greek world from the end of the Peloponnesian War to the Roman conquest of Greece; the careers of Alexander the Great and his successors; the art, literature, science, religion, and philosophy of the post-classical or Hellenistic world. Not offered every year. **PREREQS:** HST 101 or graduate standing.

HST 525. THE HOLOCAUST IN ITS HISTORY (4). An inquiry into the causes, course, and impact of the Holocaust. The general theme of anti-Semitism in European history is explored for background. Topics discussed for comparative purposes include: anti-Semitism in American history; other episodes of mass murder in the 20th century. Not offered every year.

HST 526. WORLD WAR I: A GLOBAL HISTORY (4). Examines World War I from a global perspective, its origins, the course of the conflict and its aftermath, looking especially at Great Britain, France, Russia, Germany and their colonial possessions. Topics will include the concept of total war and the home fronts of a number of nations. **PREREQS:** HST 103

HST 527. TEACHING THE HOLOCAUST (4). Provides a broad sense of the Holocaust; reviews the event itself, its long-term background (the history of anti-Semitism), and the rise of Nazism and Fascism in the years before World War II. Examines what has been learned from the Holocaust and addresses the broader issue of genocide, especially in the 20th century. "Teaching the Holocaust" is directed toward certified teachers and students preparing for teaching careers. Lectures are delivered online. Course includes a day-long set of workshops that deal with issues associated with teaching the Holocaust and genocide.

HST 528. HISTORY OF WESTERN THOUGHT (4). A synthesis of major developments in philosophy, science, social, and political theory and the arts in the European Enlightenment (1715-1789). Not offered every year. HST 528, HST 529, HST 530 need not be taken in sequence.

HST 529. HISTORY OF WESTERN THOUGHT (4). A synthesis of major developments in philosophy, science, social, and political theory and the arts between 1789 and 1890. Not offered every year. HST 528, HST 529, HST 530 need not be taken in sequence.

HST 530. HISTORY OF WESTERN THOUGHT (4). A synthesis of major developments in philosophy, science, social, and political theory and the arts between 1890 and 1945. Not offered every year. HST 528, HST 529, HST 530 need not be taken in sequence.

HST 532. THE HISTORY OF SEXUALITY (4). The history of human sexuality from ancient Greece to the present.

HST 533. ENGLISH HISTORY (4). The major political, cultural, economic, social and religious developments that have shaped the history of England and ultimately of America and much of the world. Medieval and Tudor-Stuart England. HST 433/HST 533, HST 434/HST 534 need not be taken in sequence. Not offered every year.

HST 534. ENGLISH HISTORY (4). The major political, cultural, economic, social and religious developments that have shaped the history of England and ultimately of America and much of the world. England since 1688. HST 433/HST 533, HST 434/HST 534 need not be taken in sequence. Not offered every year.

HST 535. THE HISTORY OF EUROPEAN WOMEN FROM 1400 TO 1789 (4). Focuses on the social, economic, and cultural roles women in Europe between 1400 and 1789. Topics include Christianity and women, the Renaissance lady, the European witch craze, women rulers, the debate about female intellectual abilities, and the beginning of the campaign for female equality. **PREREQS:** HST 102, HST 103 recommended.

HST 536. HISTORY OF MODERN GERMANY (4). Political, economic, social and intellectual developments from 1815 through the imperial, Weimar, and Nazi eras to the present. Not offered every year.

HST 552. MODERN MEXICO (4). History of Mexico since 1810--economic, political, and social change and relations with the United States. Not offered every year. **PREREQS:** HST 350 or HST 351 or graduate standing.

HST 556. PROBLEMS IN LATIN AMERICAN HISTORY (4). A focused examination of the origins and development of selective institutions and problems important to understanding the region, such as the church, the military, labor, political instability, economic stagnation, and social stratification. **PREREQS:** HST 350 or HST 351 or graduate standing.

HST 560. AMERICAN THOUGHT AND CULTURE (4). An examination of the main currents of American thought and culture, emphasizing ideas and concepts that have influenced the development and growth of American institutions and values from 1776 to 1860. HST 460/HST 560, HST 461/HST 561, HST 462/HST 562 need not be taken in sequence. Not offered every year. **PREREQS:** HST 201 and HST 202 and HST 203 or graduate standing.

HST 561. AMERICAN THOUGHT AND CULTURE (4). An examination of the main currents of American thought and culture, emphasizing ideas and concepts that have influenced the development and growth of American institutions and values from 1860 to 1930. HST 460/HST 560, HST 461/HST 561, HST 462/HST 562 need not be taken in sequence. Not offered every year. **PREREQS:** HST 201 and HST 202 and HST 203 or graduate standing.

HST 562. AMERICAN THOUGHT AND CULTURE (4). An examination of the main currents of American thought and culture, emphasizing ideas and concepts that have influenced the development and growth of American institutions and values from 1930 to the present. HST 460/HST 560, HST 461/HST 561, HST 462/HST 562 need not be taken in sequence. Not offered every year. **PREREQS:** HST 201 and HST 202 and HST 203 or graduate standing.

HST 564. AMERICAN DIPLOMATIC HISTORY (4). American diplomatic relations from the nation's founding to 1898. HST 464/HST 564 and HST 465/HST 565 need not be taken in sequence. Not offered every year. **PREREQS:** HST 201 and HST 202 and HST 203 or graduate standing.

HST 565. AMERICAN DIPLOMATIC HISTORY (4). American diplomatic relations from 1898 to

the present. HST 464/HST 564 and HST 465/HST 565 need not be taken in sequence. Not offered every year. **PREREQS:** HST 201 and HST 202 and HST 203 or graduate standing.

HST 567. HISTORY OF THE AMERICAN WEST (4). Important themes in the transformation of western America from the pre-industrial world of native Americans to the emergence of the region as a major force in the cultural, economic, and political life of the United States. HST 467/HST 567 and HST 468/HST 568 need not be taken in sequence. Not offered every year. **PREREQS:** HST 201 and HST 202 and HST 203 or graduate standing.

HST 568. HISTORY OF THE AMERICAN WEST (4). Important themes in the transformation of western America from the pre-industrial world of native Americans to the emergence of the region as a major force in the cultural, economic, and political life of the United States. HST 467/HST 567 and HST 468/HST 568 need not be taken in sequence. Not offered every year. **PREREQS:** HST 201 and HST 202 and HST 203 or graduate standing.

HST 569. HISTORY OF THE PACIFIC NORTHWEST (4). The demographic, ecological, and cultural transformation of Oregon, Washington, and Idaho from Indian times to the present. Not offered every year. **PREREQS:** HST 201 and HST 202 and HST 203 or graduate standing.

HST 571. COLONIAL AMERICA (4). Economic, political, social, religious, and intellectual development of colonial North America from the English background to 1689. HST 471/HST 571, HST 472/572 need not be taken in sequence. Not offered every year. **PREREQS:** HST 201 or graduate standing.

HST 572. COLONIAL AMERICA (4). Economic, political, social, religious, and intellectual development of colonial North America from 1689 to 1763. HST 471/HST 571, HST 472/572 need not be taken in sequence. Not offered every year. **PREREQS:** HST 201 or graduate standing.

HST 573. THE ERA OF THE AMERICAN REVOLUTION (4). The American Revolution, the drafting of the Constitution, and the launching of the new nation, 1763 to 1789. Not offered every year. **PREREQS:** HST 201 or graduate standing.

HST 574. JEFFERSONIAN AND JACKSONIAN DEMOCRACY (4). American political, economic, religious, and social development during the early and middle national era with emphasis on the formation and growth of political parties, territorial expansion and western settlement, and the beginnings of sectional conflict. Not offered every year. **PREREQS:** HST 201 and HST 202 or graduate standing.

HST 575. CIVIL WAR AND RECONSTRUCTION (4). Origins of the war, nature of the war, and the critical postwar era, 1830s to 1880s, with special attention to the changing historiography of the period. Not offered every year. **PREREQS:** HST 202 or graduate standing.

HST 577. THE PROGRESSIVE AND NEW DEAL ERAS (4). Twentieth-century U.S. history from 1900 to 1939, with emphasis on political and economic developments; attention given to diplomatic, cultural, and social change. Not offered every year. **PREREQS:** HST 203

HST 578. THE UNITED STATES SINCE 1939 (4). United States political, cultural, and diplomatic history from the Second World War through the 1970s, with special emphasis on the Cold War at home and abroad. Not offered every year. **PREREQS:** HST 203 or graduate standing.

HST 581. ENVIRONMENTAL HISTORY OF THE UNITED STATES (4). A study of human interaction with the environment and the transformation of the landscape and ecology of North America from the Indian period to the present, with special attention to the progressive

alterations induced by the modernizing world of agriculture, industry, urbanism, and their relation to the market system in the United States. Not offered every year. **PREREQS:** Graduate standing. HST 201, HST 202, HST 203 recommended.

HST 585. POLITICS AND RELIGION IN THE MODERN MIDDLE EAST (4). The role of religious and secular ideologies in the politics of the 20th century Middle East. Topics include the impact of liberal and nationalist thought, the Iranian revolution, radical Islamist movements, and Zionism. **PREREQS:** Graduate standing or instructor approval required.

HST 586. A HISTORY OF CHRISTIANITY IN AFRICA (4). An investigation of the historical development and changing character of Christianity in Africa. Topics include the examination of the role of Christianity in the development of social identity and politics in historic Ethiopia from the early first millennium CE; Portuguese missionary efforts in Central Africa during the period of the Atlantic slave trade from the 15th to the 18th centuries; the role of 19th century missionaries in both spreading Christianity in Africa and during the European colonization of Africa at the end of the 19th century; the emergence of African independence churches and prophetic Christianity in the 20th century; and the "Africanization" of Christianity. **PREREQS:** HST 381 and/or HST 382

HST 587. WORLD WAR II: A GLOBAL HISTORY (4). Examines World War II from a global perspective, its origins, the course of the conflict and its aftermath, looking especially at the US, USSR, Britain, Germany and Japan. Topics will include the concept of total war and the home fronts of a number of nations. **PREREQS:** HST 103*

HST 588. THE UNITED STATES AND VIETNAM 1945-1995 (4). Examines the Vietnam War from both the US and Vietnamese perspective within the context of the Cold War. Political, military, social and moral issues will be covered within the concept of American exceptionalism.

HST 594. MODERN JAPAN: A CULTURAL HISTORY (4). Japanese history from the Meiji to the contemporary period (1980s/1990s). Examination of Japanese tradition and the Tokugawa period. Investigation of Westernization/modernization, imperialism, national identity, gender, atomic bomb(s), and post-war culture.

HST 595. CHINA IN THE TWENTIETH CENTURY (4). Treats the decline of the Confucian tradition, shifts in the economy, and metamorphoses of the political system. Attention is given to China's attempt to balance her Communistic revolutionary legacies with her current modernizing goals. **PREREQS:** HST 391 and HST 392 or graduate standing.

HST 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

■ HISTORY OF SCIENCE COURSES

HSTS 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

HSTS 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

HSTS 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

HSTS 411. *HISTORY OF SCIENCE (4). Stresses the interaction of scientific ideas within their social and cultural contexts. Scientific thought from ancient civilizations to the post-Roman era. Not offered every year. HSTS 411/HSTS 511, HSTS 412/HSTS 512, HSTS 413/HSTS 513 need not be taken in sequence. (H) (SS) (Bacc Core Course) **PREREQS:** Upper-division standing; at least one science sequence.

HSTS 412. *HISTORY OF SCIENCE (4). Stresses the interaction of scientific ideas within their social and cultural context. Origin of modern science in the 16th and 17th centuries. HSTS 411/HSTS 511, HSTS 412/HSTS 512, HSTS 413/HSTS 513 need not be taken in sequence. (Bacc Core Course) **PREREQS:** Upper-division standing and at least one science sequence.

HSTS 413. *HISTORY OF SCIENCE (4). Stresses the interaction of scientific ideas with their social and cultural context. Development of modern science in the 18th and 19th centuries and to the present. HSTS 411/HSTS 511, HSTS 412/HSTS 512, HSTS 413/HSTS 513 need not be taken in sequence. (Bacc Core Course) **PREREQS:** Upper-division standing and at least one science sequence.

HSTS 414. *HISTORY OF TWENTIETH-CENTURY SCIENCE (4). Focuses on the organization, practice, and theories of the natural sciences in the twentieth century, with emphasis primarily on the European and American scientific traditions from the 1890s to the present. (H) (SS) (Bacc Core Course)

HSTS 415. **THEORY OF EVOLUTION AND FOUNDATION OF MODERN BIOLOGY (4). Origin and development of Darwin's theory of evolution. Reception of theory and history of evolution to the present. (H) (SS) (Bacc Core Course) (Writing Intensive Course) **PREREQS:** Upper-division standing.

HSTS 415H. **THEORY OF EVOLUTION AND FOUNDATION OF MODERN BIOLOGY (4). Origin and development of Darwin's theory of evolution. Reception of theory and history of evolution to the present. (H) (SS) (Bacc Core Course) (Writing Intensive Course) **PREREQS:** Upper-division standing and Honors College approval required.

HSTS 416. *HISTORY OF MEDICINE PRE-1800 (4). History of medical theory and the changing role of the physician; internal development of medicine as a discipline as well as a profession; relationship of medicine's development to general changes in science and culture, to 1800. (Bacc Core Course)

HSTS 417. **HISTORY OF MEDICINE (4). History of medical theory and the changing role of the physician; internal development of medicine as a discipline as well as a profession; relationship of medicine's development to general changes in science and culture. (H) (SS) (Bacc Core Course) (Writing Intensive Course) **PREREQS:** Upper-division standing.

HSTS 418. *SCIENCE AND SOCIETY (4). Historical study of the interaction of science and society. Case studies are used from the 18th through 20th centuries. Topics vary by term. (Bacc Core Course)

HSTS 419. **STUDIES IN SCIENTIFIC CONTROVERSY: METHODS AND PRACTICES (4). Course focuses on accounts of scientific discoveries that have been controversial, to understand the rational, psychological, and social characteristics which have defined the meaning and procedures of the natural sciences. Case studies are used from the 18th through 20th centuries. (H) (SS) (Bacc Core Course) (Writing Intensive Course)

HSTS 421. *TECHNOLOGY AND CHANGE (4). Current views of technology and associated cultural changes and the contexts in which these developed; the changing role of technology in modern industrial society, especially in the United States; recent efforts to predict and control technological developments and the social and cultural consequences. (H) (SS) (Bacc Core Course) **PREREQS:** Upper-division standing.

HSTS 422. **HISTORICAL STUDIES OF SCIENCE AND POLITICS (4). The historical study of scientists, their work, their political and ethical choices mainly in the United States and Europe from the 1920s to the 1950s. (H) (Bacc

Core Course) (Writing Intensive Course)

HSTS 423. *SCIENCE AND RELIGION (4). A historical survey of critical issues in the relationship of Western science and religion from ancient times to the end of the twentieth century. (H) (Bacc Core Course)

HSTS 425. **HISTORY OF THE LIFE SCIENCES (4). History of ideas about life from Greeks to present day. Cultural background and development of major theories of the life sciences with emphasis on natural history. (Bacc Core Course) (Writing Intensive Course) **PREREQS:** Upper-division standing plus one year college sciences.

HSTS 437. **HISTORY OF ANIMALS IN SCIENCE (4). Using a variety of sources, this course explores the ways humans have thought about and used animals in science and medicine from the seventeenth century to the present. How has science constructed the boundaries between humans and animals, and what have the consequences been for each? (Writing Intensive Course)

HSTS 440. *HISTORY OF PSYCHOTHERAPY (4). The history of psychotherapy in modern Western societies, from biomedical, cultural, political, and psychosocial perspectives. Not offered every year. (H) (Bacc Core Course)

HSTS 440H. *HISTORY OF PSYCHOTHERAPY (4). The history of psychotherapy in modern Western societies, from biomedical, cultural, political, and psychosocial perspectives. Not offered every year. (H) (Bacc Core Course) **PREREQS:** Honors College approval required.

HSTS 470. *ECOLOGY AND HISTORY: LANDSCAPES OF THE COLUMBIA BASIN (3). Integrates environmental history and landscape ecology of the Columbia River Basin from geologic origins to the present, to create an understanding of change caused by natural processes and human activities. **CROSSLISTED** as FW 470/FW 570. (H) (Bacc Core Course) **PREREQS:** (HST 201 and HST 202 and HST 203) or BI 370

HSTS 499. SPECIAL TOPICS (1-16). (H) This course is repeatable for a maximum of 16 credits.

HSTS 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

HSTS 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Graduate standing; departmental approval required.

HSTS 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

HSTS 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

HSTS 511. HISTORY OF SCIENCE (4). Stresses the interaction of scientific ideas within their social and cultural context. Scientific thought from ancient civilizations to the post-Roman era. Not offered every year. HSTS 411/HSTS 511, HSTS 412/HSTS 512, HSTS 413/HSTS 513 need not be taken in sequence. **PREREQS:** Graduate standing and at least one science sequence.

HSTS 512. HISTORY OF SCIENCE (4). Stresses the interaction of scientific ideas with their social and cultural context. Origin of modern science in the 16th and 17th centuries. HSTS 411/HSTS 511, HSTS 412/HSTS 512, HSTS 413/HSTS 513 need not be taken in sequence. **PREREQS:** Graduate standing and at least one science sequence.

HSTS 513. HISTORY OF SCIENCE (4). Stresses the interaction of scientific ideas with their social and cultural context. Development of modern science in the 18th and 19th centuries and to the present. HSTS 411/HSTS 511, HSTS 412/HSTS 512, HSTS 413/HSTS 513 need not be taken in sequence. **PREREQS:** Graduate standing and at least one science sequence.

HSTS 514. HISTORY OF TWENTIETH-CENTURY SCIENCE (4). Focuses on the organization, practice, and theories of the natural sciences in the twentieth century, with emphasis primarily on the European and American scientific traditions from the 1890s to the present.

HSTS 515. THEORY OF EVOLUTION AND FOUNDATION OF MODERN BIOLOGY (4). Origin and development of Darwin's theory of evolution. Reception of theory and history of evolution to the present. **PREREQS:** Graduate standing.

HSTS 516. HISTORY OF MEDICINE PRE-1800 (4). History of medical theory and the changing role of the physician; internal development of medicine as a discipline as well as a profession; relationship of medicine's development to general changes in science and culture, to 1800.

HSTS 517. HISTORY OF MEDICINE (4). History of medical theory and the changing role of the physician; internal development of medicine as a discipline as well as a profession; relationship of medicine's development to general changes in science and culture. **PREREQS:** Graduate standing.

HSTS 518. SCIENCE AND SOCIETY (4). Historical study of the interaction of science and society. Case studies are used from the 18th through 20th centuries. Topics vary by term.

HSTS 519. STUDIES IN SCIENTIFIC CONTROVERSY: METHOD AND PRACTICE OF (4). Course focuses on accounts of scientific discoveries that have been controversial, to understand the rational, psychological, and social characteristics which have defined the meaning and procedures of the natural sciences. Case studies are used from the 18th through 20th centuries.

HSTS 521. TECHNOLOGY AND CHANGE (4). Current views of technology and associated cultural changes and the contexts in which these developed; the changing role of technology in modern industrial society, especially in the United States; recent efforts to predict and control technological developments and the social and cultural consequences. **PREREQS:** Graduate standing.

HSTS 522. HISTORICAL STUDIES OF SCIENCE AND POLITICS (4). The historical study of scientists, their work, their political and ethical choices mainly in the United States and Europe from the 1920s to the 1950s.

HSTS 523. SCIENCE AND RELIGION (4). A historical survey of critical issues in the relationship of Western science and religion from ancient times to the end of the twentieth century. **PREREQS:** Graduate standing.

HSTS 525. HISTORY OF THE LIFE SCIENCES (4). History of ideas about life from Greeks to present day. Cultural background and development of major theories of the life sciences with emphasis on natural history. **PREREQS:** Graduate standing plus one year college sciences.

HSTS 537. HISTORY OF ANIMALS IN SCIENCE (4). Using a variety of sources, this course explores the ways humans have thought about and used animals in science and medicine from the seventeenth century to the present. How has science constructed the boundaries between humans and animals, and what have the consequences been for each? **PREREQS:** Upper-division standing.

HSTS 540. HISTORY OF PSYCHOTHERAPY (4). The history of psychotherapy in modern Western societies, from biomedical, cultural, political, and psychosocial perspectives. Not offered every year.

HSTS 570. ECOLOGY AND HISTORY: LANDSCAPES OF THE COLUMBIA BASIN (3). Integrates environmental history and landscape ecology of the Columbia River Basin from geologic origins to the present, to create an understanding of change caused by natural processes and

human activities. CROSSLISTED as FW 470/FW 570. **PREREQS:** (HST 201 and HST 202 and HST 203) or BI 370

HSTS 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 36 credits.

HSTS 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Graduate standing and departmental approval required.

■ PEACE STUDIES COURSES

PAX 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PAX 201. STUDY OF PEACE AND THE CAUSES OF CONFLICT (3). Examination of the causes of personal, social, and institutional conflict and peaceful, constructive means of dealing with conflict. The history and current status of peace movements within and outside governments; prospects for world peace. Case studies in peace and conflict. (H)

PAX 402. INDEPENDENT STUDY (1-16). Individual basic and applied study projects on peace-related issues, designed in consultation with the Peace Studies Program director or a member of the Peace Studies faculty. This course is repeatable for a maximum of 16 credits.

PAX 405. READING AND CONFERENCE (1-16). Study supervised and directed by members of the Peace Studies Program committee or approved faculty, as arranged by the student and Peace Studies Program director. This course is repeatable for a maximum of 16 credits.

PAX 407. SEMINAR (1-16). Close examination of peace-related topics, including theory, method, research, and application. May be taken more than one time as topics vary. This course is repeatable for a maximum of 16 credits.

PAX 410. PEACE STUDIES INTERNSHIP (1-16). Directed, supervised, and evaluated field work, to supplement the student's classroom work, arranged one term in advance. This course is repeatable for a maximum of 16 credits.

PAX 415. TOPICS IN PEACE STUDIES (1-16). Selected topics relevant to the study of conflict, peace, and war. May be taken more than one time as topics vary.

PAX 499. TOPICS IN PEACE STUDIES (1-4). Examination of the work of a particular nonviolence theorist or of a specific problem; e.g. pacifism and humanitarian intervention, nonviolence and gender. Course may be repeated as appropriate. Not offered every year. This course is repeatable for a maximum of 8 credits.

PAX 502. INDEPENDENT STUDY (1-16). Individual basic and applied study projects on peace-related issues, designed in consultation with the Peace Studies Program director or a member of the Peace Studies faculty. This course is repeatable for a maximum of 16 credits.

PAX 505. READING AND CONFERENCE (1-16). Study supervised and directed by members of the Peace Studies Program committee or approved faculty, as arranged by the student and Peace Studies Program director. This course is repeatable for a maximum of 16 credits.

PAX 507. SEMINAR (1-16). Close examination of peace-related topics, including theory, method, research, and application. May be taken more than one time as topics vary. This course is repeatable for a maximum of 16 credits.

PAX 510. PEACE STUDIES INTERNSHIP (1-16). Directed, supervised, and evaluated field work, to supplement the student's classroom work, arranged one term in advance. This course is repeatable for a maximum of 16 credits.

PAX 515. TOPICS IN PEACE STUDIES (1-16). Selected topics relevant to the study of conflict, peace, and war. May be taken more than one time as topics vary.

PAX 599. TOPICS IN PEACE STUDIES (1-4). Examination of the work of a particular nonviolence theorist or of a specific problem; e.g. pacifism and humanitarian intervention, nonviolence and gender. Course may be repeated as appropriate. Not offered every year. This course is repeatable for a maximum of 8 credits.

■ PHILOSOPHY COURSES

PHL 101. CRITICAL THINKING (4). Analysis of arguments, basic patterns of inductive and deductive reasoning, logical relations, and logical fallacies. Intended to improve analytical, critical and reasoning skills.

PHL 110. CRITICAL ANALYSIS (3). Development of a question-asking attitude for academic study. Enables students to explore issues and make informed decisions. **PREREQS:** EOP students only.

PHL 121. *REASONING AND WRITING (3). Develops critical thinking skills to increase clarity and effectiveness of student writing; uses writing experiences to teach critical thinking skills. Subjects include identifying and evaluating arguments, analyzing assumptions, justifying claims with reasons, avoiding confused or dishonest reasoning, applying common patterns of reasoning in everyday contexts, and writing cogent complex arguments. (Bacc Core Course)

PHL 150. *GREAT IDEAS IN PHILOSOPHY (3). Explores the assumptions and deeper meanings of familiar concepts and experiences. An introduction to some basic and famous ideas in Western thought. Topics may include truth, beauty, infinity, perception, freedom, pleasure, knowledge, mind and body, morality, justice, and political authority. (H) (Bacc Core Course)

PHL 160. *QUESTS FOR MEANING: WORLD RELIGIONS (4). A survey and analysis of the search for meaning and life fulfillment represented in major religious traditions of the world, such as Hinduism, Buddhism, Taoism, Zen, Confucianism, Judaism, Christianity, and Islam. (H) (Bacc Core Course)

PHL 160H. *QUESTS FOR MEANING: WORLD RELIGIONS (4). A survey and analysis of the search for meaning and life fulfillment represented in major religious traditions of the world, such as Hinduism, Buddhism, Taoism, Zen, Confucianism, Judaism, Christianity, and Islam. (H) (Bacc Core Course) **PREREQS:** Honors College approval required.

PHL 170. *THE IDEA OF GOD (4). Concepts and images of God and their connections to world-views, experience, science, gender, society, self-understanding, and religions. (Bacc Core Course)

PHL 199. SPECIAL STUDIES (1-16). May be repeated for credit when topic varies. This course is repeatable for a maximum of 16 credits.

PHL 201. *INTRODUCTION TO PHILOSOPHY (4). An in-depth introduction to the methods and ideas of Western philosophy, concentrating on such great figures as Socrates, Plato, Aristotle, Descartes, Kant and Nietzsche and such topics as the nature of reality, the existence of God, knowledge and doubt, the relation of consciousness to the world, free will and determinism, good and evil, and minds and machines. Philosophers and ideas covered will vary by the section. Written assignments are required. (H) (Bacc Core Course)

PHL 202. INTRODUCTION TO RELIGIOUS STUDIES (4). An introduction to the academic study of religion. It examines the concepts of religion and the sacred, approaches to the study of religion, ubiquitous features of religious experience, including symbol, myth, ritual, and community, understandings of the human condition in diverse religious traditions, and ways religious communities address challenges of pluralism and secularization.

PHL 205. *ETHICS (4). Introduction to ethical theory and to the evaluation of ethical issues in

society such as sexual ethics and euthanasia. Includes the study of philosophical theories of moral responsibility and moral virtue, and the philosophical ideas behind ethics debates in society. Students are encouraged to develop their own positions on ethical issues through discussion projects and term papers. (H) (Bacc Core Course)

PHL 205H. *ETHICS (4). Introduction to ethical theory and to the evaluation of ethical issues in society such as sexual ethics and euthanasia. Includes the study of philosophical theories of moral responsibility and moral virtue, and the philosophical ideas behind ethics debates in society. Students are encouraged to develop their own positions on ethical issues through discussion projects and term papers. (H) (Bacc Core Course) **PREREQS:** Honors College approval required.

PHL 206. *RELIGIOUS ETHICS AND MORAL PROBLEMS (4). An examination of the practical ethics of the monotheistic religious traditions of the West—Judaism, Christianity, Islam—and their different approaches to concrete moral problems. Topics include sexuality and marriage, euthanasia, capital punishment, pacifism and just war, and environmentalism. (Bacc Core Course)

PHL 207. *POLITICAL PHILOSOPHY (4). Introductory study of the philosophical justifications of political systems and philosophical theories about the rights and obligations of citizens and governments. (H) (Bacc Core Course)

PHL 207H. *POLITICAL PHILOSOPHY (4). Introductory study of the philosophical justifications of political systems and philosophical series about the rights and obligations of citizens and government. (H) (Bacc Core Course) **PREREQS:** Honors College approval required.

PHL 208. INTRODUCTION TO BUDDHIST TRADITIONS (4). Survey of the historical development of Buddhism in India and its spread throughout Asia and beyond by investigating the literature, rituals, history and social structure of the Buddhist traditions of Sri Lanka and Southeast Asia, Tibet and the Himalayan region, China, Taiwan, Korea, Japan, and finally its growth in the West.

PHL 210. *RELIGION IN THE UNITED STATES (4). A thematic overview of the historical study of religion in the United States, with an eye toward ways that social and cultural contexts have shaped the religious experience of Americans in different places and times. Surveys a wide array of religious movements, groups, and individuals from the colonial period to present. CROSSLISTED as HST 210. (Bacc Core Course)

PHL 210H. *RELIGION IN THE UNITED STATES (4). A thematic overview of the historical study of religion in the United States, with an eye toward ways that social and cultural contexts have shaped the religious experience of Americans in different places and times. Surveys a wide array of religious movements, groups, and individuals from the colonial period to present. CROSSLISTED as HST 210H. (Bacc Core Course) **PREREQS:** Honors College approval required.

PHL 213. *INTRODUCTION TO HINDU TRADITIONS (4). Survey of the historical development of Hinduism in India and the "Hindu Diaspora." Topics will include the Indus Valley civilization, the Vedic tradition, yoga, and Hindu renunciation, "Classical" Hindu theism and devotion, Hindu philosophy and ritual, and modern and contemporary Hinduism. (Bacc Core Course)

PHL 214. *INTRODUCTION TO ISLAMIC TRADITIONS (4). Development of Islamic traditions in the Arab world and in the global context. Origins of Islam, the narrative of the Prophet Muhammad, the development of the Qur'an, and the central tenets of Islamic faith and practice. Transformation of Islam from a regional to a global tradition. (Bacc Core Course)

PHL 220. *WORLD-VIEWS AND VALUES IN THE BIBLE (4). A study of central portions of the Bible (in the Old Testament: Torah, prophets, psalms, and wisdom; in the New Testament:

Jesus, gospels, and letters) from the perspective of the academic discipline of biblical scholarship, exploring the philosophical questions of the relationships between story, myth, thought, values, and understandings of life. (H) (Bacc Core Course)

PHL 220H. *WORLD-VIEWS AND VALUES IN THE BIBLE (4). A study of central portions of the Bible (in the Old Testament: Torah, prophets, psalms, and wisdom; in the New Testament: Jesus, gospels, and letters) from the perspective of the academic discipline of biblical scholarship, exploring the philosophical questions of the relationships between story, myth, thought, values, and understandings of life. (H) (Bacc Core Course) **PREREQS:** Honors College approval required.

PHL 251. *KNOWERS, KNOWING, AND THE KNOWN (4). An introduction to the major debates in Western philosophy concerning the nature of reality, and the ways we come to know about that reality. One example concerns debates about the problem of skepticism: Is it possible that humans could be completely mistaken about the way the world is? Another example concerns debates about human identity and free will. Beginning with historical figures such as Descartes and Hume, the course also provides an introduction to more contemporary thinkers. (Bacc Core Course)

PHL 251H. *KNOWERS, KNOWING, AND THE KNOWN (4). An introduction to the major debates in Western philosophy concerning the nature of reality, and the ways we come to know about that reality. One example concerns debates about the problem of skepticism: Is it possible that humans could be completely mistaken about the way the world is? Another example concerns debates about human identity and free will. Beginning with historical figures such as Descartes and Hume, the course also provides an introduction to more contemporary thinkers. (Bacc Core Course) **PREREQS:** Honors College approval required.

PHL 280. *ETHICS OF DIVERSITY (4). Uses moral philosophy to examine difference-based discrimination and prejudice in the human community. (H) (Bacc Core Course)

PHL 299. SELECTED TOPICS (1-16). This course is repeatable for a maximum of 99 credits.

PHL 301. *HISTORY OF WESTERN PHILOSOPHY (4). A study of the history of Western philosophy from the early Greeks into the twentieth century. Designed to give an appreciation and understanding of the Western philosophical tradition and the philosophical foundations of Western civilization. May be taken independently. PHL 301: Greek and Roman philosophy. PHL 302: The rise of modern philosophy through Hume. PHL 303: Kant and the nineteenth century. (H) (Bacc Core Course) **PREREQS:** 3 credits of philosophy recommended.

PHL 302. *HISTORY OF WESTERN PHILOSOPHY (4). A study of the history of Western philosophy from the early Greeks into the twentieth century. Designed to give an appreciation and understanding of the Western philosophical tradition and the philosophical foundations of Western civilization. May be taken independently. PHL 301: Greek and Roman philosophy. PHL 302: The rise of modern philosophy through Hume. PHL 303: Kant and the nineteenth century. (H) (Bacc Core Course) **PREREQS:** 3 credits of philosophy recommended.

PHL 303. *HISTORY OF WESTERN PHILOSOPHY (4). A study of the history of Western philosophy from the early Greeks into the twentieth century. Designed to give an appreciation and understanding of the Western philosophical tradition and the philosophical foundations of Western civilization. May be taken independently. PHL 301: Greek and Roman philosophy. PHL 302: The rise of modern philosophy through Hume. PHL 303: Kant and the nineteenth century. (H) (Bacc Core Course) **PREREQS:** 3 credits of philosophy recommended.

PHL 312. *ASIAN THOUGHT (4). Familiarizes students with key figures in the history of Asian religious ideas and philosophy. While the emphasis will be on the philosophical traditions of Asia, it will quickly become apparent that philosophy and religion are not so easily distinguishable in many Asian traditions. Areas of thought studied will include Hindu, Buddhist, Confucian, and Taoist. (NC) (Bacc Core Course)

PHL 315. *GANDHI AND NONVIOLENCE (4). An examination of the life and work of Mohandas K. Gandhi, the 20th century activist and author, and the theory and practice of nonviolence in his life and work. Emphasis will be placed upon Gandhi's biographical narrative, the development of satyagraha, Gandhi's nonviolent approach to social transformation, and post-Gandhian nonviolent movements. (Bacc Core Course)

PHL 315H. *GANDHI AND NONVIOLENCE (4). An examination of the life and work of Mohandas K. Gandhi, the 20th century activist and author, and the theory and practice of nonviolence in his life and work. Emphasis will be placed upon Gandhi's biographical narrative, the development of satyagraha, Gandhi's nonviolent approach to social transformation, and post-Gandhian nonviolent movements. (Bacc Core Course) **PREREQS:** Honors College approval required.

PHL 316. INTELLECTUAL ISSUES OF MEXICO AND MEXICAN AMERICANS (4). The philosophical, social, cultural, and political reality of Mexican Americans and their historical roots in Mexico since the Spanish Conquest. Analysis of internal colonialism, racism, machismo, fatalism, alienation, cultural identity, as well as more contemporary including NAFTA, immigration, and U.S.-Mexican relations. (NC)

PHL 321. DEDUCTIVE LOGIC (4). Development of formal language and deductive systems for first-order, quantificational logic. Emphasis on translation of ordinary English statements into formal language. Discussion of the contrast between semantic and syntactic treatment of logical concepts. **PREREQS:** Upper-division standing or PHL 101.

PHL 325. *SCIENTIFIC REASONING (4). Introduction to and analysis of scientific reasoning. Emphasis on understanding and evaluation of theoretical hypotheses, causal and statistical models, and uses of scientific knowledge to make personal and public decisions. (Bacc Core Course)

PHL 325H. *SCIENTIFIC REASONING (4). Introduction to and analysis of scientific reasoning. Emphasis on understanding and evaluation of theoretical hypotheses, causal and statistical models, and uses of scientific knowledge to make personal and public decisions. (Bacc Core Course) **PREREQS:** Honors College approval required.

PHL 342. CONTEMPORARY ETHICS (4). A study of significant ethical developments and issues in contemporary society, including ethical principles and concepts behind social debates on such matters as sexual ethics, abortion, discrimination, the uses of animals in scientific research, and responsibilities of corporations. Not offered every year. (H) **PREREQS:** PHL 205 recommended.

PHL 344. *PACIFISM, JUST WAR, AND TERRORISM (4). An examination of the philosophical and theological issues pertaining to pacifism, justified war, and forms of terrorism in Islamic and Western traditions. Special attention is given to concepts of jihad, justifications of war, and restraints on conduct in war. (Bacc Core Course)

PHL 344H. *PACIFISM, JUST WAR, AND TERRORISM (4). An examination of the philosophical and theological issues pertaining to pacifism, justified war, and forms of terrorism in Islamic and Western traditions. Special attention is given to concepts of jihad, justifications of war, and restraints on conduct in war. (Bacc Core Course) **PREREQS:** Honors College approval required.

PHL 360. *PHILOSOPHY AND THE ARTS (4). Major philosophical theories about art and its meaning, from ancient to modern times. How philosophers have understood beauty, the imagination, art and knowledge, art and pleasure, art and emotion. Offered every other year. (H) (Bacc Core Course) **PREREQS:** 3 credits of philosophy, or upper-division standing recommended.

PHL 365. *LAW IN PHILOSOPHICAL PERSPECTIVE (4). A study of philosophical issues in the law through the examination of legal cases and major essays in jurisprudence. Special attention given to concepts of justice, responsibility, liberty, law, and legal ethics. Offered every other year. (H) (Bacc Core Course) **PREREQS:** 3 credits of philosophy or upper-division standing.

PHL 371. *PHILOSOPHIES OF CHINA (4). A study of the traditional philosophies of China, including Confucianism, Taoism, Mohism, Legalism, and Buddhism. Not offered every year. (NC) (Bacc Core Course) **PREREQS:** 3 credits of philosophy or upper-division standing.

PHL 371H. *PHILOSOPHIES OF CHINA (4). A study of the traditional philosophies of China, including Confucianism, Taoism, Mohism, Legalism, and Buddhism. Not offered every year. (NC) (Bacc Core Course) **PREREQS:** 3 credits of philosophy or upper-division standing. Honors College approval required.

PHL 390. MORAL THEORIES (3). Examines the evolution of moral philosophy from the beginning of Western, Greek-based philosophy through contemporary moral theory, and will include philosophical questions about moral philosophy generally, virtue ethics, deontology, utilitarianism, environmental ethics, animal rights, and feminism and ecofeminism. **PREREQS:** PHL 205

PHL 399. SPECIAL TOPICS IN PHILOSOPHY (1-4). Examination of the work of a philosopher or of a specific philosophical problem; e.g., Wittgenstein, determinism, perception, philosophy of mind. May be repeated for credit when topic varies. Not offered every year. This course is repeatable for a maximum of 16 credits. **PREREQS:** 3 credits of upper-division philosophy recommended.

PHL 399H. SPECIAL TOPICS IN PHILOSOPHY (1-4). Examination of the work of a philosopher or of a specific philosophical problem; e.g., Wittgenstein, determinism, perception, philosophy of mind. May be repeated for credit when topic varies. Not offered every year. This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required. 3 credits of upper-division philosophy recommended.

PHL 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Sophomore standing.

PHL 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PHL 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required and sophomore standing.

PHL 407. ^SEMINAR (1-16). (Writing Intensive Course) This course is repeatable for a maximum of 16 credits. **PREREQS:** Two upper-division philosophy courses or the equivalent and sophomore standing.

PHL 407H. ^SEMINAR (1-16). (Writing Intensive Course) This course is repeatable for a maximum of 16 credits. **PREREQS:** Two upper-division philosophy courses or the equivalent and sophomore standing. Honors College approval required.

PHL 410. INTERNSHIP (1-12). This course is repeatable for a maximum of 16 credits. **PREREQS:** Sophomore standing.

PHL 411. GREAT FIGURES IN PHILOSOPHY (4). Study of the works of a major philosopher such as Plato, Aristotle, Descartes, Hume, Kant, or Marx. Each course normally devoted to the work of a single figure. Need not be taken in sequence. Not offered every year. (H) This course is repeatable for a maximum of 16 credits. **PREREQS:** 6 credits of philosophy and sophomore standing.

PHL 417. FEMINIST PHILOSOPHIES (3). Diverse forms of feminist philosophy, including a variety of critiques, especially those based on race and class, with in-depth consideration of selected social issues such as rape and pornography. **CROSSLISTED** as WGSS 417/WGSS 517. (H) **PREREQS:** 6 credits of philosophy or upper-division standing.

PHL 421. MATHEMATICAL LOGIC (3). Rigorous definition of a formal logic and investigation of its characteristics. Emphasis on the distinction and relation between semantic and syntactic methods (model theory and proof theory) and on the meta-mathematical analysis of axiomatic theories. Not offered every year. **PREREQS:** PHL 321 or 6 credits of 400-level mathematics or computer science and sophomore standing.

PHL 430. HISTORY OF BUDDHIST PHILOSOPHY (4). Examination of the major philosophical schools, texts, and thinkers in Buddhist history, emphasizing its Indian origins, but looking beyond to the various Buddhist traditions throughout Asia.

PHL 430H. HISTORY OF BUDDHIST PHILOSOPHY (4). Examination of the major philosophical schools, texts, and thinkers in Buddhist history, emphasizing its Indian origins, but looking beyond to the various Buddhist traditions throughout Asia. **PREREQS:** Honors College approval required.

PHL 431. BUDDHISM, NON-VIOLENCE, AND SOCIAL JUSTICE (4). Contemporary ideas, theories, and practices of the international movement of socially and politically active Buddhists known as Engaged Buddhism. Particular attention will be given to the philosophical presentations of non-violence and social justice, and their applications in living Buddhist traditions.

PHL 431H. BUDDHISM, NON-VIOLENCE, AND SOCIAL JUSTICE (4). Contemporary ideas, theories, and practices of the international movement of socially and politically active Buddhists known as Engaged Buddhism. Particular attention will be given to the philosophical presentations of non-violence and social justice, and their applications in living Buddhist traditions. **PREREQS:** Honors College approval required.

PHL 432. *YOGA AND TANTRIC TRADITIONS (4). An examination of the theory and practice of yoga and tantra in the traditions of Hinduism, Buddhism, and Jainism, and in their contemporary popular manifestations. Emphasis on the representation of yoga and tantra in Indian literature and history, including contemplative practices, bodily disciplines, and ritual. (Bacc Core Course)

PHL 436. PHILOSOPHY AND RELIGION (3). Examination of significant philosophical issues or movements and their relationship to theology and religion. **PREREQS:** 6 credits of philosophy and sophomore standing.

PHL 439. PHILOSOPHY OF NATURE (3). Intensive one-week field course taught in the Cascade Range. What is nature? What is the relation of humans to the rest of the natural world? How are our concepts of nature and decisions about land use shaped by the words and metaphors we use? What is the value of wild places? What can we learn from a close study of the natural world about right ways of acting in communities, both civic and biotic? The course will draw on many ways of knowing—philosophical

analysis, close observation, and especially writing. Camping required. **PREREQS:** Admission by application, departmental approval required.

PHL 440. ENVIRONMENTAL ETHICS (3). Philosophical ideas about our ethical relationships to the land, with applications to current environmental issues. Includes a study of different conceptions of environmental ethics; philosophical problems in environmental ethics, such as the rights of animals and plants; the uses of environmental ethics by environmental groups; and selected contemporary issues on the environmental front. (H) **PREREQS:** PHL 205 and PHL 342 and PHL 365 or 6 credits of philosophy and sophomore standing.

PHL 440H. ENVIRONMENTAL ETHICS (3). Philosophical ideas about our ethical relationships to the land, with applications to current environmental issues. Includes a study of different conceptions of environmental ethics; philosophical problems in environmental ethics, such as the rights of animals and plants; the uses of environmental ethics by environmental groups; and selected contemporary issues on the environmental front. **PREREQS:** PHL 205 and PHL 342 and PHL 365 or 6 credits of philosophy and sophomore standing and Honors College approval required.

PHL 443. *WORLD VIEWS AND ENVIRONMENTAL VALUES (3). A comparative study of world-views (secular and religious, Western and Eastern, modern and ancient) and how they affect concepts of nature, environmental values, and selected environmental issues. (Bacc Core Course) (NC) **PREREQS:** One introductory-level science course and sophomore standing.

PHL 443H. *WORLD VIEWS AND ENVIRONMENTAL VALUES (3). A comparative study of world-views (secular and religious, Western and Eastern, modern and ancient) and how they affect concepts of nature, environmental values, and selected environmental issues. (Bacc Core Course) **PREREQS:** One introductory-level science course and sophomore standing and Honors College approval required.

PHL 444. *BIOMEDICAL ETHICS (4). Application of ethical principles and decision-making processes to selected problems in medicine, health care, and biotechnology. Special attention given to end-of-life choices, reproductive rights and technologies, organ transplantation, research ethics, genetic engineering, and allocating scarce resources. An interdisciplinary focus that draws on social, legal, economic, and scientific issues in ethical decisions in medicine. (H) (Bacc Core Course) **PREREQS:** Sophomore standing.

PHL 444H. *BIOMEDICAL ETHICS (4). Application of ethical principles and decision-making processes to selected problems in medicine, health care, and biotechnology. Special attention given to end-of-life choices, reproductive rights and technologies, organ transplantation, research ethics, genetic engineering, and allocating scarce resources. An interdisciplinary focus that draws on social, legal, economic, and scientific issues in ethical decision in medicine. (Bacc Core Course) **PREREQS:** Sophomore standing and Honors College approval required.

PHL 448. NATIVE AMERICAN PHILOSOPHIES (3). Native American perspectives on ways of knowing, sources of meaning and ethics, the nature of reality, self, community, and cosmos. Includes lectures, scholarship, story-telling, poetry, theater, and music as forums for this exploration. Introduces ideas of leading Native American thinkers about the human relation to the natural world, sources of strength and wisdom, the nature of time and place and spirit, right ways of acting in communities, both civic and biotic, and the place of beauty in a well-lived life. **CROSSLISTED** as ES 448/ES 548.

PHL 450. TOPICS (1-16). Uses the IDEAS MATTER lectures as the focus for an exploration of ideas that make a difference in the world.

Students read background materials, attend lectures, meet with the speakers, and write essays on the ideas they learn. This course is repeatable for a maximum of 16 credits. **PREREQS:** Sophomore standing.

PHL 451. KNOWLEDGE AND REALITY (3). Examination of significant theories of knowledge, theories concerning the nature of reality, and their connections. Includes an analysis of important concepts and problems, such as perception, induction, belief, empiricism, rationalism, and skepticism. Not offered every year. (H) **PREREQS:** 6 credits of philosophy, sophomore standing.

PHL 455. DEATH AND DYING (3). A multidisciplinary study of cultural, philosophical, and religious perspectives on death, dying, and grieving. Not offered every year. **PREREQS:** 6 credits of philosophy or sophomore standing.

PHL 461. ART AND MORALITY (3). The arts in the context of their connections to, and conflicts with, varied conceptions of the common good. Topics include free expression and community standards, museums and obligations toward cultural treasures, art in public places, public funding of art, the politics of taste. **PREREQS:** Sophomore standing.

PHL 462X. AESTHETICS OF THE NATURAL WORLD (3). Aesthetics appreciation of the natural world in Western thought and concepts and activities that shaped it. Relationship of aesthetic experiences of the natural world to art and philosophies of art, to moral reasoning, environmentalism and how we live, to concepts of knowledge and reality, to UNESCO heritage concepts.

PHL 470. PHILOSOPHY OF SCIENCE (3). Examination of philosophical questions, classic and contemporary, about science and scientific knowledge. Scientific explanations, the structure of theories, the concept of a natural law, revolutions in science, influences of the sciences and philosophy on one another, science and values. Not offered every year. (H) **PREREQS:** 6 credits of philosophy (upper-division philosophy recommended), sophomore standing.

PHL 474. PHILOSOPHY OF BIOLOGY (4). An introduction to some of the conceptual challenges engendered by contemporary evolutionary biology, including the nature of fitness, natural selection, adaptations, and species; identifying organisms, traits, and the units of selection; the evidence required to support particular adaptive or historical hypotheses; and others. **PREREQS:** Previous university-level course work in either philosophy or the biological sciences is strongly recommended.

PHL 499. TOPICS IN PHILOSOPHY (1-4). Examination of the work of a philosopher or of a specific problem; e.g., Wittgenstein, determinism, perception. May be repeated for credit when topic varies. Not offered every year. This course is repeatable for a maximum of 16 credits. **PREREQS:** 6 credits of upper-division philosophy, sophomore standing.

PHL 499H. TOPICS IN PHILOSOPHY (1-4). Examination of the work of a philosopher or of a specific problem; e.g., Wittgenstein, determinism, perception. May be repeated for credit when topic varies. Not offered every year. This course is repeatable for a maximum of 4 credits. **PREREQS:** 6 credits of upper-division philosophy, sophomore standing; Honors College approval required.

PHL 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PHL 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Sophomore standing.

PHL 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

PHL 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of

16 credits. **PREREQS:** Departmental approval required.

PHL 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Two upper-division philosophy courses or the equivalent and sophomore standing.

PHL 510. INTERNSHIP (1-12). This course is repeatable for a maximum of 16 credits. **PREREQS:** Sophomore standing.

PHL 511. GREAT FIGURES IN PHILOSOPHY (4). Study of the works of a major philosopher such as Plato, Aristotle, Descartes, Hume, Kant, or Marx. Each course normally devoted to the work of a single figure. Need not be taken in sequence. Not offered every year. This course is repeatable for a maximum of 16 credits. **PREREQS:** 6 credits of philosophy and sophomore standing.

PHL 517. FEMINIST PHILOSOPHIES (3). Diverse forms of feminist philosophy, including a variety of critiques, especially those based on race and class, with in-depth consideration of selected social issues such as rape and pornography. **CROSSLISTED** as WGSS 417/WGSS 517. **PREREQS:** 6 credits of philosophy or upper-division standing.

PHL 525. PHILOSOPHICAL METHODS (3). Examines diverse ways of approaching philosophical issues. Contains readings from different philosophical traditions. Develops understanding of the skills and conventions of philosophical argumentation.

PHL 530. HISTORY OF BUDDHIST PHILOSOPHY (4). Examination of the major philosophical schools, texts, and thinkers in Buddhist history, emphasizing its Indian origins, but looking beyond to the various Buddhist traditions throughout Asia.

PHL 531. BUDDHISM, NON-VIOLENCE, AND SOCIAL JUSTICE (4). Investigates the philosophical grounding of Buddhist ideas about non-violence, justice and social responsibility. Looks at broad-based Buddhist social activism movements and leaders; their methods of training, issues and types of actions taken by "Socially Engaged Buddhists."

PHL 532. YOGA AND TANTRIC TRADITIONS (4). An examination of the theory and practice of yoga and tantra in the traditions of Hinduism, Buddhism, and Jainism, and in their contemporary popular manifestations. Emphasis on the representation of yoga and tantra in Indian literature and history, including contemplative practices, bodily disciplines, and ritual.

PHL 536. PHILOSOPHY AND RELIGION (3). Examination of significant philosophical issues or movements and their relationship to theology and religion. **PREREQS:** 6 credits of philosophy and sophomore standing.

PHL 539. PHILOSOPHY OF NATURE (3). Intensive one-week field course taught in the Cascade Range. What is nature? What is the relation of humans to the rest of the natural world? How are our concepts of nature and decisions about land use shaped by the words and metaphors we use? What is the value of wild places? What can we learn from a close study of the natural world about right ways of acting in communities, both civic and biotic? The course will draw on many ways of knowing—philosophical analysis, close observation, and especially writing. Camping required. **PREREQS:** Admission by application, departmental approval required.

PHL 540. ENVIRONMENTAL ETHICS (3). Philosophical ideas about our ethical relationships to the land, with applications to current environmental issues. Includes a study of different conceptions of environmental ethics; philosophical problems in environmental ethics, such as the rights of animals and plants; the uses of environmental ethics by environmental

groups; and selected contemporary issues on the environmental front. **PREREQS:** PHL 205 and PHL 342 and PHL 365 or 6 credits of philosophy and sophomore standing.

PHL 541. CLASSIC MORAL THEORIES (3). Philosophical issues in ethics analyzed through the examination of such classical works in moral philosophy as Aristotle's Nichomachean ethics. Not offered every year. **PREREQS:** Either PHL 205 or PHL 342 or PHL 440 or one course in the history of philosophy.

PHL 542. CONTEMPORARY MORAL THEORIES (3). Examines contemporary ethical theories through study of moral philosophy in the 20th century, including recent developments in such areas as environmental ethics and feminist/feminine ethics. **PREREQS:** At least two philosophy courses including at least one of PHL 205 or PHL 342 or PHL 541.

PHL 543. WORLD VIEWS AND ENVIRONMENTAL VALUES (3). A comparative study of world-views (secular and religious, Western and Eastern, modern and ancient) and how they affect concepts of nature, environmental values, and selected environmental issues. **PREREQS:** One introductory-level science course and sophomore standing.

PHL 544. BIOMEDICAL ETHICS (4). Application of ethical principles and decision-making processes to selected problems in medicine, health care, and biotechnology. Special attention given to end-of-life choices, reproductive rights and technologies, organ transplantation, research ethics, genetic engineering, and allocating scarce resources. An interdisciplinary focus that draws on social, legal, economic, and scientific issues in ethical decisions in medicine. **PREREQS:** Sophomore standing.

PHL 547. RESEARCH ETHICS (3). An examination of the interrelationship between ethical values and scientific practice. Topics include professionalism in science; scientific integrity, misconduct, and whistleblowing; the ethics of authorship; conflicts of interest between academic science and commercial science, and social responsibilities in science.

PHL 548. NATIVE AMERICAN PHILOSOPHIES (3). Native American perspectives on ways of knowing, sources of meaning and ethics, the nature of reality, self, community, and cosmos. Includes lectures, scholarship, story-telling, poetry, theater, and music as forums for this exploration. Introduces ideas of leading Native American thinkers about the human relation to the natural world, sources of strength and wisdom, the nature of time and place and spirit, right ways of acting in communities, both civic and biotic, and the place of beauty in a well-lived life. **CROSSLISTED** as ES 448/ES 548.

PHL 550. TOPICS (1-16). Uses the IDEAS MATTER lectures as the focus for an exploration of ideas that make a difference in the world. Students read background materials, attend lectures, meet with the speakers, and write essays on the ideas they learn. This course is repeatable for a maximum of 16 credits. **PREREQS:** Sophomore standing.

PHL 551. KNOWLEDGE AND REALITY (3). Examination of significant theories of knowledge, theories concerning the nature of reality, and their connections. Includes an analysis of important concepts and problems, such as perception, induction, belief, empiricism, rationalism, and skepticism. Not offered every year. **PREREQS:** 6 credits of philosophy, sophomore standing.

PHL 555. DEATH AND DYING (3). A multidisciplinary study of cultural, philosophical, and religious perspectives on death, dying, and grieving. Not offered every year. **PREREQS:** 6 credits of philosophy or sophomore standing.

PHL 561. ART AND MORALITY (3). The arts in the context of their connections to, and conflicts with, varied conceptions of the common good.

Topics include free expression and community standards, museums and obligations toward cultural treasures, art in public places, public funding of art, the politics of taste. **PREREQS:** Sophomore standing.

PHL 562X. AESTHETICS OF THE NATURAL WORLD (3). Aesthetics appreciation of the natural world in Western thought and concepts and activities that shaped it. Relationship of aesthetic experiences of the natural world to art and philosophies of art, to moral reasoning, environmentalism and how we live, to concepts of knowledge and reality, to UNESCO heritage concepts.

PHL 570. PHILOSOPHY OF SCIENCE (3). Examination of philosophical questions, classic and contemporary, about science and scientific knowledge. Scientific explanations, the structure of theories, the concept of a natural law, revolutions in science, influences of the sciences and philosophy on one another, science and values. Not offered every year. **PREREQS:** 6 credits of philosophy (upper-division philosophy recommended), sophomore standing.

PHL 574. PHILOSOPHY OF BIOLOGY (4). An introduction to some of the conceptual challenges engendered by contemporary evolutionary biology, including the nature of fitness, natural selection, adaptations, and species; identifying organisms, traits, and the units of selection; the evidence required to support particular adaptive or historical hypotheses; and others. **PREREQS:** Previous university-level course work in either philosophy or the biological sciences is strongly recommended.

PHL 599. TOPICS IN PHILOSOPHY (1-4). Examination of the work of a philosopher or of a specific problem; e.g., Wittgenstein, determinism, perception. May be repeated for credit when topic varies. Not offered every year. This course is repeatable for a maximum of 16 credits. **PREREQS:** 6 credits of upper-division philosophy, sophomore standing.

TCS 301. *WORLD COMMUNITY IN THE TWENTIETH CENTURY: UNDERDEVELOPMENT (3). A study of the relations of dependence in the contemporary world, emphasizing the impact of metropolitan centers upon geographically dispersed, predominantly agricultural societies of the Third World. An examination of the altered social and cultural patterns that dependence entails for traditional communities. (Bacc Core Course)

TCS 407. SEMINAR (1-12). Advanced study of selected topics related to issues and problems in the twentieth century introduced in TCS core course offerings. Section I seminars will be graded pass/no pass and carry 1 credit; other sections will be graded A-F and will carry variable credit. This course is repeatable for a maximum of 16 credits.

TCS 507. SEMINAR (1-12). Advanced study of selected topics related to issues and problems in the Twentieth Century introduced in TCS core course offerings. Section I seminars will be graded P/N and carry 1 credit; other sections will be graded A-F and will carry variable credit. This course is repeatable for a maximum of 16 credits.

SCHOOL OF LANGUAGE, CULTURE, AND SOCIETY

Susan Shaw, *Transitional Director*
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FACULTY

Professors Brauner, Garcia, Gross, Khanna, Krause, Lee, Price, Rosenberger, Rivera-Mills, Shaw, Wood, Xing

Associate Professors Boudraa, Cheyney, Davis, Duncan, McMurray, Minc, Sakurai, Thompson, Tilt, Yu

Assistant Professors Barnd, Boovy, Cárdenas, Carpena-Mendez, Driskill, Heiduschke, Lopez-Cevallos, K. Maes, Shirazi, Trujillo

Senior Instructors Chavarria, Escala, McCullough, Nakajima

Instructors Accapadi, Akins, Almquist, Begeg-Dov, Briggs, Davis-Malewitz, Dean, Denis, Detar, DeSoyza, Esterberg, Fernandez-Paul, Freehling-Burton, Hansen, Hayashi, Heck, Ho, Holden, Imarisha, Krebs, Kudlacek, Lazzaretti, Leoni, Ligget, C. Maes, Morales Ortiz, Nakamura, Nygen, Osborne-Gowey, Palacios, Palmer, Polcene-Markin, Ren, Reynolds, Robelo, Rowe, Schuster-Provaznikova, Sharp, St. Germain, Van Londen, Warren, Yurchenko

Undergraduate Majors

Anthropology (BA, BS, HBA, HBS)

Options

Archaeology/Physical Anthropology
Biocultural Option
Cultural Anthropology
General Anthropology (Ecampus only)

Ethnic Studies (BA, BS, HBA, HBS)

French (BA, HBA)

German (BA, HBA)

Spanish (BA, HBA)

Women, Gender, and Sexuality Studies
(BA, BS, HBA, HBS)

Minors

Anthropology

Asian Languages and Cultures

Ethnic Studies

French

German

Queer Studies

Russian [Suspended]

Spanish

Women, Gender, and Sexuality Studies

Undergraduate Certificates

Food in Culture and Social Justice

Language in Culture

Latin American Affairs

Medical Humanities

Russian Studies [Suspended]
Women, Gender, and Sexuality Studies

Graduate Majors

Applied Anthropology (MA, MAIS, PhD)

Graduate Areas of Concentration

MA in Applied Anthropology: Native Americans: past and present, biocultural medical anthropology, cultural resource management, globalization/localization, historic archaeology, language and cross-cultural communications, natural resources and communities PhD in Applied Anthropology: Archaeology; business, organization and work; ethnicity, culture and health; local values, indigenous knowledge and environment

Contemporary Hispanic Studies (MA)

Graduate Area of Concentration

Contemporary Hispanic Studies

Women, Gender, and Sexuality Studies (MA, MAIS)

Graduate Areas of Concentration

Contemporary Women's Issues
Leadership and Community Engagement
Race, Class and Gender
Sexuality Studies
Transnational Perspectives

Graduate Minors

Anthropology

Graduate Area of Concentration

Applied cultural anthropology, biocultural evolution, cross-cultural communication, cultural resource management, general anthropology, historic archaeology, medical anthropology, natural resource and community development, prehistoric archaeology

Applied Anthropology

Graduate Area of Concentration

American Indians-past and present, cultural resource management, historic archaeology, language and cross-cultural communications, natural resources and communities

Contemporary Hispanic Studies

Ethnic Studies

Graduate Area of Concentration

Ethnic Studies

Food in Culture and Social Justice

Foreign Languages and Literatures

Graduate Areas of Concentration

Modern languages, French, German, Spanish

Queer Studies

Women, Gender, and Sexuality Studies

Graduate Areas of Concentration

Contemporary Women's Issues
Leadership and Community Engagement
Race, Class and Gender
Sexuality Studies
Transnational Perspectives

Graduate MAIS

Anthropology

Applied Anthropology

Ethnic Studies

Foreign Languages and Literatures

French

German

Spanish

Women, Gender, and Sexuality Studies
Primary or Secondary Area

ANTHROPOLOGY

Anthropology offers courses to meet the needs of students interested in a comprehensive understanding of human societies and cultures past and present. Prehistoric, historic, ethnographic, and linguistic study provides the basis for understanding how a variety of societies solve common problems. The anthropology curriculum provides a cross-cultural perspective, a sound basis for later professional or graduate education.

An anthropology degree enables students to pursue a broad range of jobs requiring a liberal arts background; for example, education, human and governmental services, law, business, media, and medicine. It prepares them especially well for work situations that emphasize cross-cultural awareness, international contacts and management of cultural resources.

Anthropology bridges sciences and the humanities and develops critical thinking, communication skills, facility with group processes, and the ability to work independently. It can help students succeed in an increasingly interconnected and complex world.

ETHNIC STUDIES

Ethnic studies is an established academic discipline traditionally defined by a concentration on the experiences and concerns of the four major ethnic minority groups historically under-represented in United States political and institutional life and in university curricula. Ethnic studies faculty bring a variety of methodological approaches to bear on the exploration of issues affecting African American, Asian American, Chicano/a-Latino/a, and American Indian and Alaskan Native communities. A degree in ethnic studies provides a sound basis for future work in graduate or professional programs and is of value to students interested in careers in a broad range of jobs requiring a liberal arts background and an understanding of race, ethnicity and cultural competency.

WORLD LANGUAGES

World languages and cultures (WLC) offers major programs leading to a BA degree in French, German, or Spanish, as well as minor programs in Asian Languages and Cultures, French, German, Russian [Suspended], and Spanish for undergraduate students with majors in other disciplines. The major and minor

programs provide students with the opportunity to develop language skills and to raise their understanding of and appreciation for foreign literatures and cultures.

Proficiency in a foreign language and knowledge of a foreign culture can enhance career possibilities in fields that range from business, library work, and government service to park service, oceanography, agriculture, and forestry. Students often find it possible to combine languages with another major such as business administration, psychology, political science, sociology, and professional training to prepare for an exciting, internationally oriented career.

Study of a language other than English can help students improve communication skills in English, become more linguistically aware, develop analytical skills, and communicate on an equal basis with non-English-speaking people. Through language courses, students can gain a global perspective, more fully understand different cultures and value systems, and enhance their general knowledge of world development.

An undergraduate academic major (French, German, or Spanish) is required as a prerequisite to the Fifth-Year Teacher Education Program designed to prepare students for licensure and/or other graduate programs in education.

WLC cooperates with institutions of the Oregon University System and with other Northwest institutions of higher education in administering overseas study centers at Beijing and Fujian, China; Quito, Ecuador; Angers, Lyon, and Poitiers, France; Baden-Wurtemberg and Cologne, Germany; Tokyo, Japan; Seoul, Korea; Puebla, Mexico; Santander, Oviedo, and Segovia, Spain. Students may also study at different institutions in Russia and in the former Soviet republics. The school cooperates with the Office of International Student and Faculty Services to offer study programs in Chillan, Chile; San Jose, Costa Rica. See the International Programs section of this catalog.

LIBERAL STUDIES

The BA degree in Liberal Studies offers area studies that allow students to use language and culture courses taken in the School of Language, Culture, and Society to fulfill core course requirements. Students majoring in liberal studies can elect to complete their undergraduate degree using prestructured programs in the following areas: Asian studies, Chinese studies, European studies, Japanese studies, and Russian studies [suspended].

A minimum of 45 credits of course work in the concentration area is required to complete the Liberal Studies major.

WOMEN, GENDER, AND SEXUALITY STUDIES

Women, Gender, and Sexuality Studies is the multidisciplinary study of gender and women's lives and experience. Course work explores women's realities in such areas as the political and social sciences, health, psychology, history, literature and arts. Women studies programs grew out of the women's movement, involving understandings of sexist discrimination in society and a need to celebrate women's strengths, contributions and forms of resistance. Grounded in this feminist knowledge, women studies is constantly growing and changing in order to understand and affirm the role that issues of race, class, age, ability, appearance and sexual identities play in women's everyday lives. It is hoped that students will find Women, Gender, and Sexuality Studies to be academically challenging and personally rewarding. The goal is to provide a program that is intellectually sound and vocationally useful, as well as one that encourages personal growth. The Women, Gender, and Sexuality Studies Program offers an undergraduate major, minor, and certificate, as well as the MA in Women, Gender, and Sexuality Studies and the opportunity to declare Women, Gender, and Sexuality Studies as a primary and/or secondary area in the MAIS.

Women studies faculty are also drawn from colleges across the university. Many teach Women Studies Program courses in their home schools and are involved in research projects that give them different perspectives on the challenges in women studies knowledge. These faculty are not listed on this page.

CERTIFICATE PROGRAMS

The School of Language, Culture, and Society participates in the Languages in Culture, Latin American Affairs and Russian Studies certificate programs. These interdisciplinary programs are designed for students who wish to combine their school major with a broad knowledge of Latin American or Russian affairs, past and present, or who wish to explore how languages and cultures interact. Core courses are typically taken in language, in the humanities and social sciences.

GRADUATE PROGRAMS

The School of Language, Culture, and Society offers master's of arts and doctor of philosophy degrees in Applied Anthropology, Contemporary Hispanic Studies, and Women Studies. Graduate minors are offered in Anthropology, Applied Anthropology, Contemporary Hispanic Studies, Ethnic Studies, Food in Culture and Social Justice, Foreign Languages and Literatures, and Women, Gender, and Sexuality Studies.

Students may earn the Master of Arts in Interdisciplinary Studies (MAIS) degree in the areas of anthropology, applied anthropology, ethnic studies, foreign languages and literatures, French, German, Spanish, and women studies. Typically, candidates who select French, German or Spanish as one of their primary areas complete graduate course work in language, linguistics, literature and culture studies. To be admitted to a foreign language component of the MAIS degree, students must meet the Graduate School's general entrance requirements and obtain the consent of a graduate faculty member of the School of Language, Culture, and Society who agrees to serve as the field advisor. A maximum of 6 graduate credits completed at an overseas study center may be used to satisfy requirements for any one of three fields of the MAIS degree.

MASTER OF ARTS IN TEACHING [SUSPENDED]

(French, German, Spanish)

In conjunction with the Professional Teacher Education Program the School of Language, Culture, and Society offers a Master of Arts in Teaching (MAT) degree that prepares students for initial Oregon teaching certification in the following licensure areas: French, German, and Spanish. The program consists of courses in education, practicum, and subject graduate course work in the target language. To be admitted to the program students must demonstrate advanced proficiency in French, German or Spanish (as defined by the School of Language, Culture, and Society). For complete program details students should contact the school's MAT graduate advisor or the College of Education.

(Bilingual Education/ESOL)

The School of Language, Culture, and Society also supports an MAT program leading to a secondary endorsement in Bilingual Education and in English to Speakers of Other Languages (ESOL). To obtain the bilingual education endorsement students must complete course work in education and achieve a proficiency level in a target foreign language as defined by the school. For complete program details students should contact the school's MAT graduate advisor or the College of Education.

UNDERGRADUATE MAJORS WITH OPTIONS

Anthropology (BA, BS, CRED, HBA, HBS)

Major Requirements

Majors develop a broad anthropological background. You must select one of the four following options:

1. Archaeology/Physical Anthropology (50 credits)

2. Biocultural Option (50 credits)
3. Cultural Anthropology (48 credits)
4. General Anthropology (49 credits) is for distance education students only.

The curriculum accommodates upper division and transfer students. Requirements take two years to complete.

A grade of C– or better is required for all courses used to complete major requirements. Such courses cannot be taken S/U. Major requirements are listed in each option.

OPTIONS

ARCHAEOLOGY/PHYSICAL ANTHROPOLOGY OPTION

Core (Select 20 credits)

- ANTH 110. *Introduction to Cultural Anthropology (3)
 or ANTH 210. *Comparative Cultures (3)
 ANTH 230. Time Travelers (3)
 ANTH 240. Introduction to Biological Anthropology (3)
 ANTH 350. Language, Culture and Society (4)
 ANTH 370. ^Anthropological Theories (4)
 ANTH 441. Hominid Evolution (4)

Advanced (Select 30 credits)

- ANTH 331. Mesoamerican Prehistory (3)
 ANTH 345. *Biological and Cultural Constructions of Race (3)
 ANTH 380. *Cultures in Conflict (3)
 ANTH 420. World Cultures-Topics (4)
 ANTH 421. Analysis of Lithic Technologies (3)
 ANTH 422. Historic Materials Analysis (3)
 ANTH 423. Method and Theory in Historical Archaeology (3)
 ANTH 424. Settlement Archaeology (3)
 ANTH 425. Ceramic Analysis in Archaeology (3)
 ANTH 430. Topics in Archaeology (1–4)
 ANTH 432. *The Archaeology of Domestication and Urbanization (3)
 ANTH 433. First Americans, Last Frontiers (3)
 ANTH 434. North America After the Ice Age (3)
 ANTH 435. Cultural Resources: Policy and Procedures (3)
 ANTH 436. Northwest Prehistory (3)
 ANTH 437. Geoarchaeology (3)
 ANTH 438. Archaeology Field School (10–12)
 ANTH 439. Archaeological Study of Foraging Lifeways (3)
 ANTH 440. Topics in Physical Anthropology (1–4)
 ANTH 442. Human Adaptability (4)
 ANTH 443. Human Osteology Lab (4)
 ANTH 445. Biocultural Anthropology Lab (4)
 ANTH 446. Forensic Anthropology (3)
 Any course in the 490s

Total=50

BIOCULTURAL OPTION

Core: 20 credits

- ANTH 110. *Introduction to Cultural Anthropology or Comparative Cultures (3)
 or ANTH 210. *Comparative Cultures (3)
 ANTH 230. Time Travelers (3)
 ANTH 240. *Introduction to Biological Anthropology (3)
 ANTH 350. Language, Culture and Society (4)

- ANTH 370. ^Anthropological Theories (4)
 ANTH 383. *Introduction to Medical Anthropology (3)

Advanced Electives: 30 credits Select one from below:

- ANTH 311. *Peoples of the World-North America (3)
 ANTH 312. *Peoples of the World-Europe (3)
 ANTH 313. *Peoples of the World-Latin America (3)
 ANTH 314. *Peoples of the World-Middle East (3)
 ANTH 315. *Peoples of the World-Africa (3)
 ANTH 316. *Peoples of the World-South and Southeast Asia (3)
 ANTH 317. *Peoples of the World-Pacific (3)
 ANTH 318. *Peoples of the World-China (3)
 ANTH 319. *Peoples of the World-Japan and Korea (3)
 ANTH 345. *Biological and Cultural Constructions of Race (3)
 ANTH 352. *Anthropology, Health, and Environment (3)
 ANTH 380. *Cultures in Conflict (3)
 ANTH 420. World Cultures-Topics (4)
 ANTH 433. First Americans, Last Frontiers (3)
 ANTH 439. Archaeological Study of Foraging Lifeways (3)
 ANTH 440. Topics in Physical Anthropology (1–4)(*Anthropological Demography, The Biology of Poverty, Evolutionary Medicine*)
 ANTH 441. Human Evolution (4)
 ANTH 442. Human Adaptability (4)
 ANTH 443. Human Osteology Lab (4)
 ANTH 444. Nutritional Anthropology (4)
 ANTH 445. Biocultural Anthropology Lab (4)
 ANTH 446. Forensic Anthropology (3)
 ANTH 449. Biocultural Perspectives on Human Reproduction (4)
 ANTH 450. Topics in Linguistic Anthropology (1–4)
 ANTH 452. Folklore and Expressive Culture (4)
 ANTH 463. Anthropological Research: Professional and Ethical Conduct (4)
 ANTH 465. Popular Culture: An Anthropological Perspective (4)
 ANTH 470. Topics in Cultural Anthropology (1–16)
 ANTH 471. Cash, Class and Culture: Hunter-Gatherers to Capitalism (4)
 ANTH 472. Contemporary Indian Issues (4)
 ANTH 474. Cross-Cultural Health and Healing (4)
 ANTH 477. Ecological Anthropology (4)
 ANTH 478. Anthropology of Tourism (4)
 ANTH 479. Anthropology of Migration (4)
 ANTH 480. Topics in Applied Anthropology (1–4)
 ANTH 482. *Anthropology of International Development (4)
 ANTH 483. Advanced Medical Anthropology (4)
 ANTH 484. *Wealth and Poverty (3)
 ANTH 486. Anthropology of Food (2–6)
 ANTH 488. *Business and Asian Culture (3)
 ANTH 489. Anthropology of Business (3)
 ANTH 490. Topics in Methodology (1–4)

Total=50

CULTURAL ANTHROPOLOGY OPTION

Core (17)

- ANTH 110. *Introduction to Cultural Anthropology (3)
 or ANTH 210. *Comparative Cultures (3)
 ANTH 230. Time Travelers (3)
 ANTH 240. Introduction to Biological Anthropology (3)
 ANTH 350. Language, Culture, and Society (4)
 ANTH 370. ^Anthropological Theories (4)

Advanced (31)

- ANTH 311–ANTH 319. *Peoples of the World (3)
 ANTH 345. *Biological and Cultural Constructions of Race (3)
 ANTH 352. *Anthropology, Health, and Environment (3)
 ANTH 380. *Cultures in Conflict (3)
 ANTH 420. World Cultures (4)
 ANTH 452. Folklore and Expressive Culture (4)
 Any course in the 460s, 470s, 480s, 490s

Total=48

GENERAL ANTHROPOLOGY OPTION

Available via Ecampus only.

Core (17)

- ANTH 110. *Introduction to Cultural Anthropology (3)
 or ANTH 210. *Comparative Cultures (3)
 ANTH 230. Time Travelers (3)
 ANTH 240. Introduction to Biological Anthropology (3)
 or ANTH 330. *Evolution of People, Technology, and Society (3)
 ANTH 350. Language, Culture, and Society (4)
 ANTH 370. ^Anthropological Theories (4)

Advanced (32)

Select 18 credits from the following:

- ANTH 311–ANTH 319. *Peoples of the World (3)
 ANTH 380. *Cultures in Conflict (3)
 ANTH 383. *Introduction to Medical Anthropology (3)
 ANTH 420. World Cultures (4)
 ANTH 452. Folklore and Expressive Culture (4)
 Any course in the 460s, 470s, 480s, 490s

Select 14 credits from the following:

- ANTH 345. *Biological and Cultural Constructions of Race (3)
 ANTH 421. Analysis of Lithic Technologies (3)
 ANTH 422. Historic Materials Analysis (3)
 ANTH 423. Method and Theory in Historical Archaeology (3)
 ANTH 424. Settlement Archaeology (3)
 ANTH 430. Topics in Archeology (1–4)
 ANTH 432. *The Archaeology of Domestication and Urbanization (3)
 ANTH 433. First Americans, Last Frontiers (3)
 ANTH 434. North America After the Ice Age (3)
 ANTH 435. Cultural Resources: Policy and Procedures (3)
 ANTH 436. Northwest Prehistory (3)
 ANTH 438. Archaeology Field School (10–12)

- ANTH 440. Topics in Physical Anthropology (1-4)
 ANTH 441. Hominid Evolution (4)
 ANTH 442. Human Adaptability (4)
 ANTH 443. Human Osteology Lab (4)
 ANTH 444. Nutritional Anthropology (3)
 ANTH 445. Biocultural Anthropology Lab (4)
 ANTH 446. Forensic Anthropology (3)
 ANTH 449. Biocultural Perspectives on Human Reproduction (4)
 ANTH 492. Archeological Laboratory Methods (1-3)

Total=49

ETHNIC STUDIES (BA, BS, CRED, HBA, HBS)

In addition to an ethnic studies core of issue-based courses that examine the intersections of race, class and gender and their relation to the construction of ethnicity, one area of emphasis on a specific ethnic group and a community internship are required.

Students work closely with a departmental advisor to determine a program of study that best meets their needs.

A grade-point average of 2.00 is required and majors must earn a grade of C- or above in all major courses.

Individualized research and study is limited to 3 credits.

Ethnic Studies Core (22)

- ES 101. *Introduction to Ethnic Studies (3)
 ES 201. Inventing Ethnic America (3)
 ES 354. ^Literature of Ethnic Minorities in the United States (4)
 ES 410. Internship (9)
 ES 451. Theories of Race and Ethnicity (3)
 ES 455. Internship Seminar (1)

Emphasis (30)

One sequence from the following focus areas (6 credits total):

Chicano/a-Latino/a Studies

- ES 212. *Survey of Chicano/a-Latino/a Studies (3)
 ES 213. *Contemporary Latino/a Culture and Issues (3)

African American Studies

- ES 221, ES 223. *Survey of African American Studies I, II (3,3)

Asian American Studies

- ES 231. *Asian American Studies: Mid-1800s-Present (4)
 ES 233. *Asian American Studies II: Activism and Empowerment (3)

Native American Studies

- ES 243. *Native American Experience in the 20th Century U.S. (3)
 9 credits distributed across of the remaining focus areas listed above (3 credits from each; 9 total).

15 credits of upper-division electives in an area of emphasis to be approved by the major advisor and to include a minimum of 6 credits at the 400 level (some courses may be taken from a list of nondepartmental offerings, subject to departmental approval).

Total=52

FRENCH (BA, CRED, HBA)

The minimum upper-division course requirements are listed below. Additional requirements are available from departmental advisors and the departmental office. Required courses may not be taken S/U.

French (45)

- FR 311, FR 312, FR 313. Third-Year French (3,3,3)⁸
 FR 333. *French Culture and Society Since the Revolution (3)^{7,8}
 FR 339. French: Francophone Studies (3)⁸
 FR 340. Introduction to French Literary Studies (3)⁸
 FR 411. Fourth-Year French (3)^{7,8}
 FR 439. ^French: Francophone Studies (3)⁸
 Upper-division French electives, to be approved by the major advisor (21)

Total=45

All prospective majors and minors must see a departmental advisor at least once a year.

WLC majors must participate in an OUS and OSU-approved study abroad program or in an approved internship experience in a French-, German-, or Spanish-speaking country or fulfill this requirement as determined by the director.

Students who do not find an OSU-approved program (this includes OUS and other programs run through IDEA and OUS) that fits their academic and/or geographical needs can petition to have a different program approved by a sub-committee of the Study Abroad Advisory Committee. The requirement for petitioning a program must include an academic and/or geographic reason why a student is choosing a program not on the approved list.

Footnotes:

- ⁷ Must be taken on the Corvallis campus.
⁸ These courses must be completed with a B average.

GERMAN (BA, CRED, HBA)

Also available via Ecampus.

Critical study of issues in German language, literature, culture, and film.

The minimum upper-division course requirements are listed below. Additional requirements are available from departmental advisors and the departmental office. Required courses may not be taken S/U.

German (45)

- GER 311, GER 312, GER 313. Third-Year German (3,3,3)
 GER 331. *German Culture (3)
 GER 341. Survey of German Literature (3)
 GER 361. Critical Issues of German Cinema (3)
 GER 411. ^Fourth-Year German (3)
Upper-division electives in German and related fields from the following list (24):
 GER 319. Selected Topics in German Language (3)

- GER 329. Selected Topics in Literature and/or Culture (3)
 GER 332. *German Culture (3)
 GER 339. Selected Topics in German Culture (3)
 GER 342. Survey of German Literature (3)
 GER 343. Survey of German Literature (3)
 GER 349. Selected Topics in German Literature (3)
 GER 351. German Pronunciation and Phonetics (3)
 GER 355. Translation (3)
 GER 362. Divided Screen: German Cinema Between 1945 and 1990 (3)
 GER 363. Contemporary German Cinema (3)
 GER 379. Proctor Experience (1-2)
 GER 399. Special Topics (1-16)
 GER 401. Research (1-16)
 GER 402. Independent Study (1-16)
 GER 403. Thesis (1-16)
 GER 405. Reading and Conference (1-16)
 GER 407. Seminar (1-16)
 GER 410. Internship (1-16)
 GER 412. Fourth-Year German (3)
 GER 413. Fourth-Year German (3)
 GER 449. Selected Topics in German Literature (3)
 GER 488. German Studies, German Study Center (1-12)
 HST 425. *The Holocaust in Its History (4)
 HST 426. World War I: A Global History (4)
 HST 436. History of Modern Germany (4)
 HST 438. The Will and Self (4)
 HST 487. World War II: A Global History (4)
 MUS 473. German Diction for Singers (2)

Total=45

All prospective majors and minors must see a departmental advisor at least once a year.

WLC majors must participate in an OUS and OSU-approved study abroad program or in an approved internship experience in a French-, German-, or Spanish-speaking country or fulfill this requirement as determined by the director.

Students who do not find an OSU-approved program (this includes OUS and other programs run through IDEA and OUS) that fits their academic and/or geographical needs can petition to have a different program approved by a sub-committee of the Study Abroad Advisory Committee. The requirement for petitioning a program must include an academic and/or geographic reason why a student is choosing a program not on the approved list.

SPANISH (BA, CRED, HBA)

The minimum upper-division course requirements are listed below. Additional requirements are available from departmental advisors and the departmental office. Required courses may not be taken S/U.

Spanish (45)

- SPAN 331, SPAN 332, SPAN 333. *The Cultures of Spain and Portugal (3,3,3)⁸ and/or SPAN 336, SPAN 337, SPAN 338, SPAN 339. *Latin American Culture (3,3,3,3)⁸

SPAN 438. ^Selected Topics in Luso-Hispanic Culture (3)⁸
Upper-division Spanish electives, to be approved by the major advisor (24–33)

Total=45

All prospective majors and minors must see a departmental advisor at least once a year.

WLC majors must participate in an OUS and OSU-approved study abroad program or in an approved internship experience in a French-, German-, or Spanish-speaking country or fulfill this requirement as determined by the director.

Students who do not find an OSU-approved program (this includes OUS and other programs run through IDEA and OUS) that fits their academic and/or geographical needs can petition to have a different program approved by a sub-committee of the Study Abroad Advisory Committee. The requirement for petitioning a program must include an academic and/or geographic reason why a student is choosing a program not on the approved list.

Footnotes:

⁸ These courses must be completed with a B average.

* Bacc Core Course

^ Writing Intensive Course (WIC)

WOMEN, GENDER, AND SEXUALITY STUDIES (BA, BS, CRED, HBA, HBS)

Also available via Ecampus.

The Women, Gender, and Sexuality Studies major represents an interdisciplinary curriculum composed of course work in the social sciences and humanities with gender as the focal point of analysis. The curriculum examines women's experiences, past and present, through feminist theory and research to better understand differences in power and privilege based on gender as well as race and ethnicity, religion, socioeconomic status, sexual identity, age, physical appearance, and mental or physical ability. Many classes incorporate a social activism component, and students are required to complete an internship to put their course work into action as well as a senior research project to understand and contribute to the scholarship in this field.

A total of 51 credits is required for the major, 33 credits of required Women, Gender, and Sexuality Studies core courses and 18 credits of elective courses chosen from Women, Gender, and Sexuality Studies or Women, Gender, and Sexuality Studies Program courses. An approved program course is one that has a focus on gender and/or women's issues, is taught in a unit other than the Women, Gender, and Sexuality Studies Program, and has been approved as fulfilling the requirements of a Women, Gender, and Sexuality Studies course.

No more than 9 credits of Women, Gender, and Sexuality Studies Program courses may be used toward the major. All required course work must be taken on campus and no more than 6 credits of online elective course work can be used toward the on-campus major.

Baccalaureate Core (48 credits excluding WIC)

Liberal Arts Core (15 credits)

Fine Arts (3)
Humanities (3)
Non-Western Culture (3)
Social Sciences (3)
Plus one additional course from the above areas (3)

College of Liberal Arts BA/BS Requirements (15)

- The BA requires second year language proficiency at the college level with C grade or better
- The BS requires 15 credits in science, computer science, and quantitative studies.

Free Electives to allow for a minor or second major (51)

WGSS Major Requirements (51 credits)

With the exception of WIC, courses used to satisfy requirements for the major may not be used to meet baccalaureate or liberal arts core requirements.

Core

WGSS 223. *Women: Self and Society (3)
WGSS 224. *Women: Personal and Social Change (3)
WGSS 262. *Introduction to Queer Studies (3)
WGSS 270. Violence Against Women (3)
WGSS 410. Internship (3)
WGSS 414. *Systems of Oppression in Women's Lives (3)
WGSS 416. Theories of Feminism (4)
WGSS 430. Women of Color in the U.S. (3)
WGSS 460. ^Women and Sexuality (3)
WGSS 480. *International Women (3)
WGSS 498. Senior Seminar (4)

Electives (18)

WS Electives

WGSS 199. Special Studies (3)
WGSS 230. *Women in the Movies (3)
WGSS 235. *Women in World Cinema (3)
WGSS 240. *Women and Sport (3)
WGSS 280. *Women Worldwide (3)
WGSS 299. Topics in Women Studies (3)
WGSS 320. *Gender and Technology (3)
WGSS 325. *Disney: Gender, Race, Empire (3)
WGSS 340. *Gender and Science (3)
WGSS 380. *Muslim Women (3)
WGSS 399. Topics in Women Studies (1–6)
WGSS 402. Independent Study (3)
WGSS 406. Projects (1–16)
WGSS/PHL 417. Feminist Philosophies (3)
WGSS 420. *Hate, Resistance, and Reconciliation (3)
WGSS 440. *Women & Natural Resources (3)
WGSS 450. Ecofeminism (3)
WGSS 465. Women, Weight, and Body Image (3)

WGSS/PSY 466. *Fat Studies (3)
WGSS 490. Self-Esteem and Personal Power (3)
WGSS 495. *Global Feminist Theologies (3)

Program Course Electives

ANTH 473. *Gender, Ethnicity, and Culture (3)
COMM 432. Gender and Communication (3)
ENG 362. *American Women Writers (4)
ENG 416. *Power and Representation (4)
ENG 497. *International Women's Voices (4)
ENG 498. Women and Literature (4)
ES 437. Gender Issues in Asian American Studies (3)
ES 457. Literature by Women of Color in the U.S. (3)
H 465. *Public Health and Women: Social and Policy Issues (3)
H 474. Public Health and Violence in Society (3)
HDFS 444. Family Violence and Neglect (4)
HDFS 447. *Families and Poverty (4)
HST 362. Women in United States History (4)
HST 368. *Lesbian and Gay Movements in Modern America (4)
HST 390. *Midwest Women: In Their Own Words (4)
HST 432. The History of Sexuality (4)
HST 435. The History of European Women From 1400-1789 (4)
PS 317. Gender and Politics (4)
PS 363. *Gender and Race in American Political Thought (4)
PS 425. *Gender and Law (4)
PSY 426. *Psychology of Gender (4)
PSY 456. Social Development (4)
SOC 312. *Sociology of the Family (4)
SOC 430. Gender and Society (4)
SOC 466. International Development: Gender Issues (4)
SOC 480. *Environmental Sociology (4)

Total=180

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

UNDERGRADUATE MINORS

ANTHROPOLOGY MINOR

Also available via Ecampus.

A grade of C– or better is required for all courses used to complete minor requirements. Such courses cannot be taken for an S/U grade.

Select 27 credits from the following:

ANTH 110. *Introduction to Cultural Anthropology (3)
ANTH 210. *Comparative Cultures (3)
ANTH 230. Time Travelers (3)
ANTH 240. Introduction to Biological Anthropology (3)
ANTH 251. *Language in the USA (3)
ANTH 311. *Peoples of the World-North America (3)
ANTH 312. *Peoples of the World-Europe (3)
ANTH 313. *Peoples of the World-Latin America (3)
ANTH 314. *Peoples of the World-Middle East (3)
ANTH 315. *Peoples of the World-Africa (3)
ANTH 316. *Peoples of the World-South

and Southeast Asia (3)

ANTH 317. *Peoples of the World-Pacific (3)

ANTH 318. *Peoples of the World-China (3)

ANTH 319. *Peoples of the World-Japan and Korea (3)

ANTH 330. *Evolution of People, Technology, and Society (3)

ANTH 345. *Biological and Cultural Constructions of Race (3)

ANTH 350. Language, Culture and Society (4)

ANTH 380. *Cultures in Conflict (3)

Any 3-credit course from 430s through 490s

Total=27

ASIAN LANGUAGES AND CULTURES MINOR

Requirements

A total of 21 upper-division credits are required. Fifteen credits out of the 21 credits must be completed in residence with an average grade of C. The courses offered through Ecampus are included.

Chinese Concentration

CHN 311, CHN 312, CHN 313. Third-Year Chinese Language (3,3,3)

CHN 333. *Chinese Culture (3)

Japanese Concentration

JPN 311, JPN 312, JPN 313. Third-Year Japanese (3,3,3)

JPN 333. *Japanese Culture (3)

Electives

9 credits from the following courses after consultation with an advisor:

CHN 331, CHN 332. *Chinese Culture (3,3)

JPN 331, JPN 332. *Japanese Culture (3,3)

Special topics in Chinese/Japanese Language, culture, and literature (1-3 credits):

CHN 399. Special Topics (1-3)

JPN 399. Special Topics (1-3)

Courses related to China or Japan in other OSU departments or completed abroad on an approved study-abroad program

ETHNIC STUDIES MINOR

In addition to an ethnic studies core of issue-based courses that examine the intersections of race, class and gender and their relation to the construction of ethnicity, one area of emphasis on a specific ethnic group is required.

Students will work closely with a departmental advisor to determine a program of study that best meets their needs.

A grade-point average of 2.00 and a grade of C- or above in all minor course work are required. Individualized research or study is limited to 3 credits.

Note: The internship for this minor, ES 410, is optional. If the internship is taken for 3 credits, upper-division electives will be reduced to 6 credits.

Ethnic Studies Core (9)

ES 101. *Introduction to Ethnic Studies (3)

ES 201. Inventing Ethnic America (3)

One 400-level comparative Ethnic Studies course (3)

One sequence from an area of emphasis below (6 credits total): *Chicano/a-Latino/a Studies*

ES 212. *Survey of Chicano/a-Latino/a Studies I (3)

ES 213. *Contemporary Latino/a Culture and Issues (3)

African American Studies

ES 221, ES 223. *Survey of African American Studies I, II (3,3)

Asian American Studies

ES 231. *Asian American Studies: Mid-1800s-Present (4)

ES 233. *Asian American Studies II: Activism and Empowerment (3)

Native American Studies

ES 243. *Native American Experience in the 20th Century U.S. (3)

12 credits of upper-division electives in an area of emphasis to be approved by the major advisor and to include a minimum of 3 credits at the 400 level (some courses may be taken from a list of nondepartmental offerings, subject to departmental approval).

Optional:

ES 455. Internship Seminar (1)

Total=27

FRENCH MINOR

FR 211, FR 212, FR 213. Second-Year French (4,4,4)

FR 311, FR 312. Third-Year French (3,3)

FR 313. Third-Year French (3)

or FR 315. French for Business (3)

Upper-division French electives (may include FR 270, France Today) to be approved by the minor advisor (6)

Total=30

All prospective majors and minors must see a departmental advisor at least once a year.

GERMAN MINOR

Also available via Ecampus.

GER 211, GER 212, GER 213. Second-Year German (4,4,4)

GER 311, GER 312, GER 313. Third-Year German (3,3,3)

Select 9 credits from below:

GER 331. *German Culture (3)

AND

Any 6 credits from the list of approved upper-division electives as determined by a language advisor and the program director.

Total=30

**All prospective majors and minors must see a departmental advisor at least once a year.
Approved upper-division electives:**

GER 319. Selected Topics in German Language (3)

GER 329. Selected Topics in Literature and/or Culture (3)

GER 332. *German Culture (3)

GER 339. Selected Topics in German Culture (3)

GER 341. Survey of German Literature (3)

GER 342. Survey of German Literature (3)

GER 343. Survey of German Literature (3)

GER 349. Selected Topics in German Culture (3)

GER 351. German Pronunciation and Phonetics (3)

GER 355. Translation (3)

GER 361. Critical Issues of German Cinema (3)

GER 362. Divided Screen: German Cinema Between 1945 and 1900 (3)

GER 363. Contemporary German Cinema (3)

GER 399. Special Topics (1-16)

GER 410. Internship (1-15)

GER 488. German Studies, German Study Center (1-12)

QUEER STUDIES MINOR

The undergraduate minor in Queer Studies prepares students to examine how gender and sexuality are constructed and policed and, further, imagines liberatory futures for people of all genders and sexualities. Centering itself on the activism and scholarship of women of color, transnational feminisms, Two-Spirit Indigenous people, and Lesbian, Gay, Bisexual, Transgender, and Queer (LGBTQ) people of color, this minor examines homophobia and transphobia's relationship with racism, colonialism, sexism, ableism, classism and other forms of power.

A total of 30 credits is required for the minor, with at least 12 of these credits at the upper-division level.

Core Requirements (21 Credits)

QS 262. *Introduction to Queer Studies (3)

QS 364. *Transgender Politics (3)

QS 409. Practicum: Projects in Queer Studies (3 cr. min.)

QS 431. *Queer of Color Critiques (3)

QS 462. *Queer Theories (3)

QS 472. ^Indigenous Two-Spirit and Queer Studies (3)

QS 475. Transnational Sexualities (3)
[Pending approval]

The remaining 9 credits may be taken from the Queer Studies electives (any course with the QS prefix) and from approved program courses offered by other departments. However, no more than 6 credits of approved program courses may be used toward the Queer Studies minor.

HST 368. *Lesbian and Gay Movements in Modern America (4)

QS 299. Special Topics (3)

QS 399. Special Topics in Queer Studies (3)

QS 473. Transgender Lives (3)

QS 477. *Queer/Trans People of Color, Arts and Activism (3)

QS 499. Special Topics in Queer Studies (4)

WGSS 360. *Men and Masculinities in a Global Context (3)

WGSS 460. ^Women and Sexuality (3)

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course

RUSSIAN MINOR**This minor has been suspended.**

RUS 211, RUS 212, RUS 213. Second-Year Russian (4,4,4)

RUS 311, RUS 312, RUS 313. Third-Year Russian (3,3,3)

RUS 233. *Russian Culture (3)

Upper-division Russian electives, to be approved by the minor advisor (6)

Total=30

All prospective majors and minors must see a departmental advisor at least once a year.

SPANISH MINOR

SPAN 211, SPAN 212, SPAN 213. Second-Year Spanish (4,4,4)

SPAN 311. Advanced Spanish Grammar (3) or SPAN 314. Third-Year Spanish for Native Speakers (3)

SPAN 317. Directed Reading and Writing in Spanish (3)

or SPAN 318. Introduction to Spanish-Language Literature (3)

or SPAN 327. Mexican-American Literature and Composition for Spanish Heritage Language Learners (3)

Select 6 credits from below:

SPAN 331, SPAN 332, SPAN 333. *The Cultures of Spain and Portugal (3,3)

SPAN 336, SPAN 337, SPAN 338. *Latin American Culture (3,3,3)

SPAN 339. Mexican Immigrant Experience in the United States (3)

Upper-division Spanish electives, to be approved by the minor advisor (6)

Total=30

All prospective majors and minors must see a departmental advisor at least once a year.

WOMEN, GENDER, AND SEXUALITY STUDIES MINOR**Also available via Ecampus.**

The Women, Gender, and Sexuality Studies minor provides an exploration of gender and a focus on the lives of women both in the U.S. and worldwide. It studies the interaction of gender within a complex matrix of class, race, age, ethnicity, nationality, sexual identity, appearance, and ability. Students are expected to take the bulk of their course work toward the minor from core and elective courses offered by the Women, Gender, and Sexuality Studies Program. A total of 27 credits is required for the minor, with at least 12 credits at the upper-division level.

All required course work must be taken on campus and no more than 3 credits of online elective course work can be used toward the on-campus minor.

Core Requirements (24)

WGSS 223. *Women: Self and Society (3)

WGSS 224. *Women: Personal and Social Change (3)

WGSS 262. *Introduction to Queer Studies (3)

WGSS 410. Internship (3)

WGSS 414. *Systems of Oppression in

Women's Lives (4) [Pending approval]

WGSS 416. Theories of Feminism (4)

WGSS 480. *Women in a Cross-Cultural Context (4) [Pending approval]

The remaining 3 credits may be taken from Women, Gender, and Sexuality Studies electives and from approved program courses offered in other departments. An approved program course is one that has a focus on gender and/or women's issues, is taught in a unit other than the Women, Gender, and Sexuality Studies Program, and has been approved as fulfilling the requirements of a Women, Gender, and Sexuality Studies Program course. See the electives for the Women, Gender, and Sexuality Studies major. In addition, WGSS 270: Violence Against Women (3), WGSS 340: *Gender and Science (3), WGSS 430: Women of Color in the U.S. (4), and WGSS 460: ^Women and Sexuality (4) may be taken as electives for the minor. No more than 3 credits of WGSS 402 Independent Study and WGSS 410 Internship may count toward the minor.

Total=27**GRADUATE MAJORS****APPLIED ANTHROPOLOGY (MA, PhD, MAIS)****Graduate Areas of Concentration**

MA in Applied Anthropology: Native Americans: past and present, biocultural medical anthropology, cultural resource management, globalization/localization, historic archaeology, language and cross-cultural communications, natural resources and communities. PhD in Applied Anthropology: Archaeology; Business, organization and work; ethnicity, culture and health; local values, indigenous knowledge and environment

The MA and PhD degrees in Applied Anthropology provide advanced education in anthropology that will prepare students to practice their skills in occupations in both public and private sectors at the local, national, and international levels. These courses of study integrate anthropological theory and practice within a specific concentration chosen by the student.

Electives will be drawn from university-wide graduate-level courses that complement core courses and courses chosen in one of the above concentrations.

MA Program Requirements

Core program (10–11)

Course work in major concentration (10–12)

Methods courses (3–4)

Minor credits from single or multiple schools or departments (15)

Demonstrated foreign or field language proficiency

Internship (6–12)

Research and thesis writing (6–12)

PhD Program Requirements (121)

Core program (18)

Course work in chosen concentration (18)

Minor area (18)

Methods course work (6–8)

Gender/ethnicity (3)

Seminar (1)

Thesis credits:

Comprehensive review (9)

Internship/Residency (12)

Dissertation (36)

Demonstrated proficiency in a foreign language

PhD Program Total=121 (includes course work completed for MA degree)

MAIS Degree

The school also participates in the Master of Arts in Interdisciplinary Studies (MAIS) degree program. In other advanced degree programs, anthropology may be used as a minor. See the Graduate School for details.

CONTEMPORARY HISPANIC STUDIES (MA)**Graduate Areas of Concentration**

Contemporary Hispanic studies

The MA degree in Contemporary Hispanic Studies provides an alternative to traditional pre-doctoral programs focused on literary theory or linguistics.

Based on the multidimensional approach to language education promoted in the National Standards for Foreign Language Education, this program brings together theoretical knowledge and practical skills in a single program designed to prepare students for further graduate study or for careers in education, migrant programs, nongovernmental organizations, and other sectors affected by rapidly changing demographics. The integrated minor provides additional exploration of themes related to intercultural communication from a broad, interdisciplinary perspective.

The Master of Arts in Contemporary Hispanic Studies requires completion of 48 credits of graduate-level course work. A 15-credit integrated minor emphasizing intercultural studies must also be completed.

Core Requirements (33 credits)**Spanish Language (6)**

SPAN 561. Fifth-Year Spanish (3)

SPAN 562. Fifth-Year Spanish (3)

Hispanic Cultural Studies (9)

SPAN 538. Selected Topics in Luso-Hispanic Culture (3)

Two other SPAN courses (6)

Hispanic Literature (6)

SPAN 544. Selected Topics in the Literature of Spain (3)

SPAN 545. Selected Topics in the Literature of Latin America (3)

SPAN 546. Recent Latin American Literature (3)

SPAN 547. Mexican Women Writers (3)

SPAN 548. Latin American Great Works (3)

Field/Research Project (6)

SPAN 501. Research (3)
SPAN 510. Internship (3)
SPAN 563. Fifth-Year Spanish (3)

Linguistics (6)

LING 545. Methods and Materials for
Second Language Acquisition (4)
LING 551. General Linguistics (3)
LING 599. Special Topics (3)

Integrated minor emphasizing intercultural studies (15 credits)

The integrated minor provides additional exploration of themes related to intercultural communication from a broad, interdisciplinary perspective and is comprised of other graduate-level courses approved in advanced by the Contemporary Hispanic Studies program coordinator.

AHE 507. Seminar (1–16)
AHE 599. Special Topics (1–3)
ANTH 513. World Cultures-Latin America (4)
ANTH 550. Topics in Linguistic Anthropology (1–4)
ANTH 551. Sociolinguistics (3)
ANTH 573. Gender, Ethnicity, and Culture (3)
ANTH 575. Theory of Culture (3)
ANTH 587. Language in Global Context (3)
ES 551. Theories of Race and Ethnicity (3)
ES 553. Ethnohistory Methodology (3)
HST 552. Modern Mexico (4)
HST 556. Problems in Latin American History (4)
PS 555. The United States as Viewed from Abroad (4)
SOC 537. Race and Ethnic Relations (4)
SOC 560. Comparative Societies (4)
SOC 566. International Development: Gender Issues (4)
COMM 516. Ethnography of Communication (3)
COMM 526. Intercultural Communication: Theories and Issues (3)
COMM 527. Cultural Codes in Communication (3)

WOMEN, GENDER, AND SEXUALITY STUDIES (MA, MAIS)**Core Requirements (51)**

WGSS 503. Thesis (6)
WGSS 510. Internship (3)
WGSS 511. Orientation and Professionalization I (1)
WGSS 512. Orientation and Professionalization II (1)
WGSS 513. Orientation and Professionalization III (1)
WGSS 514. Systems of Oppression in Women's Lives (4) [Pending approval]
WGSS 516. Theories of Feminism (4)
WGSS 518. Feminist Research (4)
WGSS 521. Feminist Leadership (4)
WGSS 522. Grant Writing and Fund Development for Feminist Organizations (4) [Pending approval]
WGSS 535. Feminist Teaching and Learning (4) [Pending approval]
WGSS 555. Feminist Textual and Discourse Analysis (4) [Pending approval]
WGSS 575. Critical Race Feminism and Outsider Jurisprudence (4) [Pending approval]
WGSS 586. Global Experience I (1)
WGSS 587. Global Experience II (1)
WGSS 588. Global Experience III (1)
WGSS 616 Multiracial, Transnational, and Queer Feminisms I (4) [Pending approval]
Second year proficiency in a second language as demonstrated by:
1. Two years of a college language sequence on the transcript.
2. Scoring at second-year proficiency on a language placement test.
3. Completing the 213 course of a language sequence while enrolled in the MA program.
Electives (6)
AHE 513. Research in Higher Education (3)
ANTH 549. Biocultural Perspectives on Human Reproduction (4)
ANTH 573. Gender, Ethnicity, and Culture (3)
ANTH 584. Wealth and Poverty (3)
ANTH 591. Ethnographic Methods (4)
COMM 532. Gender and Communication (3)
ENG 516. Power and Representation (4)
ENG 597. International Women's Voices (4)
ENG 598. Women and Literature (4)
ES/QS/WGSS 531. Queer of Color Critiques (4) [Pending approval]
ES 537. Gender Issues in Asian American Studies (3)
ES 557. Literature by Women of Color in the United States (3)
ES/QS/WGSS 572. Indigenous Spirit Studies (4) [Pending approval]
FES 522. Research Methods in Social Science (4)
H 515. Research Methods in Social and Behavioral Health Sciences (3)
H 565. Public Health and Women: Social and Policy Issues (3)
HDFS 530. Research in Human Development and Family Sciences I (4)
HDFS 538. Qualitative Research Methods I (4)
HDFS 547. Families and Poverty (3)
HST 532. The History of Sexuality (4)
HST 535. The History of European Women from 1400 to 1789 (4)
PHL/WGSS 517. Feminist Philosophies (3)
PS 507. Seminar: Gender and Development (4)
PS 525. Gender and the Law (4)
PSY 526. Psychology of Gender (4)
PSY 560. Advanced Social Research Methods (4)
PSY/WGSS 566. Fat Studies (4)^E
QS/WGSS 524. Trans/Gender Politics (3) [Pending approval]
QS/WGSS 562. Queer Theories (3)
QS/WGSS 573. Transgender Lives (3)
QS 599. Special Topics in Queer Studies (4)
SOC 512. Sociology of Work and Family (4)
SOC 518. Qualitative Research Methods (4)
SOC 530. Gender and Society (4)
SOC 566. International Development: Gender Issues (4)
WGSS 502. Independent Study (3)
WGSS 520. Hate, Resistance, and Reconciliation (3)
WGSS 525. Gender and Technology (3)^E
WGSS 540. Women and Natural Resources (3)^E

WGSS 550. Ecofeminism (3)^E
WGSS 560. Women and Sexuality (4)
WGSS 565. Women, Weight, and Body Image (3)
WGSS 582. Global Perspectives on Women's Health (4)
WGSS 590. Self-Esteem and Personal Power (3)
WGSS 595. Global Feminist Theologies (4) [Pending approval]
WGSS 596. Feminist Theologies in the United States (4) [Pending approval]
WGSS 599. Topics (3)

Total Minimum Required Credits=57**Footnote:**

^E Online course offered via Ecampus

GRADUATE MINORS**ANTHROPOLOGY GRADUATE MINOR****Graduate Areas of Concentration**

Applied cultural anthropology, biocultural evolution, cross-cultural communication, cultural resource management, general anthropology, historic archaeology, medical anthropology, natural resource and community development, prehistoric archaeology

The School of Language, Culture, and Society offers graduate work leading to a Master of Arts in Applied Anthropology. Areas of concentration within the applied program include applied cultural anthropology, biocultural evolution, cross-cultural communication, cultural resource management, general anthropology, historic archaeology, medical anthropology, natural resource and community development, prehistoric archaeology. The school also offers graduate work leading to a master of arts in interdisciplinary studies and participates as a minor field in other advanced degree programs. A variety of individualized programs are available within the MAIS framework.

APPLIED ANTHROPOLOGY GRADUATE MINOR**Graduate Areas of Concentration**

American Indians-past and present, cultural resource management, historic archaeology, language and cross-cultural communications, natural resources and communities

The School of Language, Culture, and Society offers graduate work leading to a Master of Arts in Applied Anthropology. Areas of concentration within the applied program include American Indians-past and present, cultural resource management, historic archaeology, language and cross-cultural communications, natural resources and communities. The school also offers graduate work leading to a master of arts in interdisciplinary studies and participates as a minor field in other advanced degree programs. A

variety of individualized programs are available within the MAIS framework.

CONTEMPORARY HISPANIC STUDIES GRADUATE MINOR

See an advisor for more information.

ETHNIC STUDIES GRADUATE MINOR

Graduate Areas of Concentration *Ethnic studies*

Graduate work in the School of Language, Culture, and Society may serve as a field of study for the Master of Arts in Interdisciplinary Studies degree or as a minor in other advanced degree programs. The program offers an interdisciplinary exploration of the critical areas of race, class, ethnicity, and gender in American life, as well as focused study of the four major ethnic minority groups of the United States (African Americans, Asian Americans, Chicano/Latinos and Native Americans).

Students applying for graduate work in ethnic studies must meet the following requirements:

1. a minimum GPA of 3.00 in the last 90 credits of graded undergraduate work on the first baccalaureate degree plus all work completed thereafter;
2. appropriate undergraduate or postgraduate work in ethnic studies. Applicants are urged to speak with an advisor prior to submitting their materials.

FOOD IN CULTURE AND SOCIAL JUSTICE GRADUATE MINOR

This interdisciplinary graduate minor in Food in Culture and Social Justice prepares students to examine food from a variety of perspectives. When and how we eat, what is considered acceptable to eat, how we prepare it, and how we learn about producing and eating food are all fascinating questions to explore by humanists and social scientists. Histories of particular food commodities and changes in the way people think about sustaining healthy bodies richly contextualizes our present practices. Cultural analyses of food and food production lead us to question the level of social justice within the local and global food systems. Students complete at least 1 credit of experiential/service learning which will be spent volunteering with food-related organizations.

Required Service Learning Course ANTH 506. *Projects: Food Projects* (1)

Choose 15 credits (master's) or 18 credits (PhD) from the following courses:

- ANTH 544. *Nutritional Anthropology* (4)
ANTH 547. *Research Methods in Food, Culture and Social Justice* (4) **[Pending submission and approval of a proposal]**
ANTH 586. *Anthropology of Food* (4)

ES 599. *Special Topics: Food and Ethnic Identity* (3)

HDFS 547. *Families in Poverty* (3)

HST 599. *Special Topics: Food in World History* (4)

RS 517. *Food Systems: Local to Global* (4) **[Pending submission and approval of a proposal]**

WGSS 565. *Women, Weight, and Body Image* (3)

FOREIGN LANGUAGES AND LITERATURES GRADUATE MINOR

Graduate Areas of Concentration *Modern languages, French, German, Spanish*

See an advisor for more information.

QUEER STUDIES GRADUATE MINOR

The graduate minor in Queer Studies prepares students to examine how gender and sexuality are constructed and policed and, further, imagines liberatory futures for people of all genders and sexualities. Centering itself on the activism and scholarship of women of color, transnational feminisms, Two-Spirit Indigenous people, and Lesbian, Gay, Bisexual, Transgender, and Queer (LGBTQ) people of color, this graduate option examines homophobia and transphobia's relationship with racism, colonialism, sexism, ableism, classism and other forms of power.

Master's students must complete a total of 15 credits, and doctoral students must complete a total of 18 credits. Students must complete a total of 12 credits. Students whose primary area is WGSS must select courses that are *in addition* to the WGSS requirements.

Required of All Students:

QS/WGSS 562. *Queer Theories* (3)

In each of the following two sections, both master's and doctoral students will complete 6 credits. In addition, doctoral students will complete an additional 3 credits from either section.

Sexuality, Gender, Race, and Nation (6 credits)

QS/WGSS 531. *Queer of Color Critiques* (3)

QS/ES/WGSS 572. *Indigenous Two-Spirit and Queer Studies* (3)

QS/ES/WGSS 577. *Queer/Trans People of Color Arts and Activism* (3)

QS 599. *Special Topics in Queer Studies* (4)

SPAN 569. *Topics in Joteria Studies* (3)

Students must complete 6 credits in the following area:

Gender Politics (6 credits)

QS/WGSS 524. *Trans/Gender Politics* (3)

QS/WGSS 573. *Transgender Lives* (3)

QS 599. *Special Topics in Queer Studies* (4)

WGSS 514. *Systems of Oppression in Women's Lives* (3)

WGSS 560. *Women and Sexuality* (3)

WGSS 585. *Transnational Feminisms* (3)

WOMEN, GENDER, AND SEXUALITY STUDIES GRADUATE MINOR

Graduate Areas of Concentration *Contemporary women's issues; leadership and community engagement; race, class and gender; sexuality studies; transnational perspectives*

Women, Gender, and Sexuality Studies is the multidisciplinary study of gender and women's lives and experiences.

Course work explores women's realities in such areas as the political and social sciences, health, psychology, history, literature, and the arts. Women, Gender, and Sexuality Studies programs grew out of the women's movement, involving understandings of discrimination in society and a need to celebrate different women's strengths, contributions, and forms of resistance.

Women, Gender, and Sexuality Studies can be elected as a primary and/or secondary field for the Master of Arts in Interdisciplinary Studies degree (MAIS) and as a graduate minor. Areas of specialization include contemporary women's issues; gender, race and class; and global women's issues. The master's program requires a thesis or research report (nonthesis option) and the completion of a core curriculum. This curriculum includes an understanding of how issues of gender, race, class, and other differences among women affect their status in Western and global perspectives. It also emphasizes the relationship between theory and strategies for social change. An internship or field placement in an agency that is concerned with gender issues or women's role and status in society is required and is designed to help students integrate classroom knowledge with practical experience. The graduate program is beneficial for any work experience in which gender is negotiated or women are affected. Women, Gender, and Sexuality Studies graduates are employed in human service agencies and programs, advocacy organizations such as battered women's shelters and women's resource centers and community organizing, teaching, business, administration, and cultural work. Many students have used their degree as a preparatory base for doctoral work.

Women, Gender, and Sexuality Studies faculty are drawn from colleges across the university. Many teach Women, Gender, and Sexuality Studies program courses in their home departments and are involved in research projects that give them different perspectives on the challenges in Women, Gender, and Sexuality Studies. These courses and faculty are not listed in this entry. For more information, contact Susan Shaw, Director, Women, Gender, and Sexuality Studies, 252 Waldo Hall, OSU, Corvallis, OR 97331.

Master of Arts in Interdisciplinary Studies (MAIS)–Primary Area in Women, Gender, and Sexuality Studies

WGSS 510. Internship (3)
 WGSS 511, 512, 513. Orientation and Professionalization I, II, III (1,1,1)
 WGSS 514. Systems of Oppression in Women's Lives (3)
 WGSS 516. Theories of Feminism (4)
 WGSS 518. Feminist Research (4)[*Thesis option only*]
 WGSS 585. Transnational Feminisms (3)
 Consult advisor for additional requirements.

CERTIFICATES

FOOD IN CULTURE AND SOCIAL JUSTICE CERTIFICATE

Food is more than simple nourishment. It is part of a system of communication firmly rooted in individual and group identities within cultures around the world. When and how we eat, what is considered acceptable to eat, how we prepare it, and how we learn about producing and eating food are all fascinating questions to explore by humanists and social scientists. Histories of particular food commodities and changes in the way people think about sustaining healthy bodies richly contextualizes our present practices. Cultural analyses of food and food production lead us to question the level of social justice within the local and global food systems. Community food security is a condition in which all community residents obtain a safe, culturally acceptable, nutritionally adequate diet through a sustainable food system that maximizes community self-reliance and social justice. Students who complete this certificate will not only have a clear idea of the cultural bases of food and food production, but will obtain some experience working towards community food security.

Complete 16 credits of core classes and then choose 6 credits of electives within the College of Liberal Arts and 6 credits of electives from outside the College of Liberal Arts.

Core (16)

ANTH 361. Food Studies in a Social Justice Perspective (4)
 ANTH 406. Projects: Food (1)
 ANTH 499. Special Topics in Anthropology: *Capstone Portfolio* (1)
 AREC/ANS/CROP/FW/HORT/FST/RS/NUTR/RNG 499/599. Special Topics: *Food Systems: Local to Global* (3)
 ES 499/ES 599. Special Topics: *Food and Ethnic Identity* (3)
 HST 416/HST 516. Food in World History (4)

Electives (6)

Complete 6 credits from among the following College of Liberal Arts classes:

ANTH 439/ANTH 539. Archaeological Study of Foraging Lifeways (3)

ANTH 444/ANTH 544. Nutritional Anthropology (4)
 ANTH 471/ANTH 571. Cash, Class, and Culture: Hunter-Gatherers to Capitalism (4)
 ANTH 482/ANTH 582. *Anthropology of International Development (4)
 ES 448/ES 548. Native American Philosophies (3)
 PHL 440/PHL 540. Environmental Ethics (3)
 SOC 426/SOC 526. *Social Inequality (4)
 WGSS 465/WGSS 565. Women, Weight, and Body Image (3)
 WGSS 466/WGSS 566. Fat Studies (3) [*Via Ecampus only.*]
 WR 383. Food Writing (4)

Electives from outside the College of Liberal Arts (6)

The first grouping of courses can count for both baccalaureate core and certificate credits.

Baccalaureate Core Courses

Cultural Diversity (3)

NUTR 216. *Food in Non-Western Culture (3)

Physical Science (with Lab) (4 or 8)

CSS/SOIL 205. *Soil Science (4)

Western Culture (3)

CSS/CROP 340. *Pens and Plows: Writings of Working the Land (3) [*CROP 340 via Ecampus only.*]

FST 260. *Food Science and Technology in Western Culture (3)

FST 273. *Wine in the Western World (3)

Difference, Power, and Discrimination Courses (3)

AG 301. *Ecosystem Science of Pacific NW Indians (3)

CSS 381. *Agriculture, Power, Discrimination, and Survival (3) [*CSS courses are at EOU LaGrande only.*]

Contemporary Global Issues (3)

AREC 461. ^Agricultural and Food Policy Issues (4)

CSS/CROP 330. *World Food Crops (3)

GEO 300. *Sustainability for the Common Good (3)

NR 350. *Sustainable Communities (4)

Science, Technology, and Society (3)

ANS 315. *Contentious Social Issues in Animal Agriculture (3)

BI/FES/TOX 435. *Genes and Chemicals in Agriculture: Value and Risk (3)

FST 421. *Food Law (3)

Other Possible Electives

Check the catalog for pre-requisites.

ANS 251. Principles of Animal Foods Technology (3)

CSS/CROP 200. Crop Ecology and Morphology (3)

CSS/CROP 480/CSS 580. Case Studies in Cropping Systems Management (4)

FST 210. Fruit and Vegetable Processing (3)

FST 212. Dairy Processing (2)

FST 360. Food Safety and Sanitation (3)

GEO 423/GEO 523. Land Use in the American West (3)

H/NUTR 477, H/NUTR 577. Dietary Interventions for Public Health (3)

H 520. Health Disparities (3)

HDFS 447/HDFS 547. *Families and Poverty (4)

HORT 112. Introduction to Horticultural Systems, Practices and Careers (2)
 HORT 260. Organic Farming and Gardening (3)
 HORT/CSS 300. Crop Production in Pacific Northwest Agroecosystems (4)
 HORT 452/HORT 552. Berry and Grape Physiology and Culture (4)
 NUTR 416/NUTR 516. ^Cultural Aspects of Foods (3)
 NUTR 417/NUTR 517. Human Nutrition Science (4)
 NUTR 423/NUTR 523. Community Nutrition (4)
 NUTR 446. Managing Food and Nutrition Services (4)
 TOX 429/TOX 529. Toxic Substances in Food (3)

Total=28

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

LANGUAGE IN CULTURE CERTIFICATE

Core (13)

ANTH 251. *Language in the USA (3)

ANTH 350. Language, Culture and Society (4)

ANTH 403. Thesis (1)

or LING 403. Thesis (1)

LING 251. Languages of Oregon (3)

LING 451/LING 551. General Linguistics (3)

Languages

To develop a sense of linguistic diversity, certificate students must study two languages other than English. End-of-second-year proficiency is required in one language and end-of-first-year proficiency in another language. One of these languages must be outside the Indo-European language family. It is highly recommended that students participate in a study abroad program.

Electives (18)

Select 18 credits from below:

ANTH 208/LING 208. *Western Culture Study Abroad (3)

ANTH 209/LING 209. *Cultural Diversity Study Abroad (3)

ANTH 450/ANTH 550. Topics in Linguistic Anthropology (1–4)

ANTH 452/ANTH 552. Folklore and Expressive Culture (4)

ANTH 487/ANTH 587. *Language in Global Context (4)

ANTH 498/ANTH 598. Oral Traditions (1–3)

COMM 326. Intercultural Communication (3)

COMM 416/COMM 516. Ethnography of Communication (3)

COMM 426/COMM 526. Intercultural Communication: Theories and Issues (3)

COMM 427/COMM 527. Cultural Codes in Communication (3)

ENG 490/ENG 590. History of the English Language (3)

ENG 495/ENG 595. Language, Technology, and Culture (3)

ENG 497/ENG 597. *International Women's Voices (3)

GER 351. German Pronunciation and Phonetics (3)

LING 359. Selected Topics in Linguistics (3)
 PSY 458/PSY 558. Language Acquisition (3)
 PH 331. *Sound, Hearing, and Music (3)
 SPAN 350. Phonetics and Pronunciation (3)
 SPAN 351. Hispanic Linguistics (3)

Total=31

Footnote:

* Baccalaureate core course

**LATIN AMERICAN AFFAIRS
 CERTIFICATE**

Juan A. Trujillo, *Director*

36 Kidder Hall

Oregon State University
 Corvallis, OR 97331-4603
 541-737-3956

Email: jtrujillo@oregonstate.edu

Students earning a Latin American Affairs certificate will have gained a broad knowledge and understanding of the history and current situation in Latin America. The program allows students with majors in any discipline to complement their professional studies; certificates are awarded concurrently with the undergraduate or graduate degree.

Course work is drawn from several departments and schools, primarily in the College of Liberal Arts. Interested students should contact the program director early in their academic careers in order to plan their schedules.

Certificate Curriculum

The course of study consists of a minimum of 30 credits: 9 credits of required core courses, and 21 credits of appropriate electives. In addition, the student must have proficiency in Spanish or Portuguese equivalent to that attained by the end of the third-year language sequence, as certified by the School of Language, Culture, and Society, or by placement scores.

The minimum of 30 credits of approved courses must include:

Core Requirement (9)

HST 350, HST 351. *Modern Latin America (4,4)

SPAN 336. *Latin American Culture (3)

Electives (21)

A minimum of 21 credits of approved Latin American courses outside the major from at least two departments/schools.

ANTH 313. *Peoples of the World-Latin America (3)

or ANTH 413. World Cultures-Latin America (4)

ES 311. Narratives of Latino Migrations (3)

ES 314. Chicano/a Literature (3)

ES 411. Chicano/as in/on Film (3)

GEO 328. *Geography of Latin America (3)

HST 452. Modern Mexico (4)

HST 456. Problems in Latin American History (4)

PHL 316. Intellectual Issues of Mexico and Mexican Americans (4)

PS 344. Latin American Politics (4)

SPAN 311. Advanced Spanish Grammar (3)

SPAN 312. Intermediate Writing Skills (3)

SPAN 313. Spanish Language Through Culture (3)

or SPAN 314, SPAN 315, SPAN 316.

Spanish for Native Speakers (3,3,3)

SPAN 337. *Latin American Culture (3)

SPAN 338. *Latin American Culture (3)

SPAN 438. ^Selected Topics in Luso-Hispanic Culture (3)

SPAN 445. Selected Topics in the Literature of Latin America (3)

Appropriate open-ended courses (402, 405, 407) through participating departments/schools, as well as transfer credits, may also be used to satisfy requirements when approved in advance by the program director.

**WOMEN, GENDER, AND
 SEXUALITY STUDIES
 CERTIFICATE**

Also available via Ecampus.

The Women, Gender, and Sexuality Studies undergraduate certificate is designed to facilitate the broad interdisciplinary study of gender and women's issues. It emphasizes the diversity of women's experience through a focus on disciplinary-based knowledge about women's lives and relationships in the many schools/departments where courses on gender are taught.

While core course work taught by the Women, Gender, and Sexuality Studies Program is required, students are expected to take the bulk of their elective course work from approved Women, Gender, and Sexuality Studies Program classes offered throughout the different academic units on campus. A total of 27 credits is required for the certificate, with at least 12 of these credits at the upper-division level.

All required course work must be taken on campus and no more than 3 credits of online elective course work can be used toward the on-campus certificate. The undergraduate certificate in Women, Gender, and Sexuality Studies is also available through Ecampus.

Core Requirements (10)

WGSS 223. *Women: Self and Society (3)

WGSS 410. Internship (3)

WGSS 414. *Systems of Oppression in Women's Lives (4)(Pending approval 3 to 4 credits)

The remaining 17 credits can be taken from elective courses offered by the Women, Gender, and Sexuality Studies Program and from approved program courses offered in any school/department at OSU. However, at least 12 of these 17 credits must consist of approved program courses. An approved program course is one that has a focus on gender and/or women's issues, is taught in a unit other than the Women, Gender, and Sexuality Studies Program, and has been approved as fulfilling the requirements of

a Women, Gender, and Sexuality Studies Program course. See the electives for the Women, Gender, and Sexuality Studies major.

No more than 3 credits of WGSS 402 Independent Study, and WGSS 410 Internship, may count toward the Women, Gender, and Sexuality Studies undergraduate certificate.

■ ANTHROPOLOGY COURSES

ANTH 110. *INTRODUCTION TO CULTURAL ANTHROPOLOGY (3). Investigates cultural adaptation and change in different environmental and historical contexts. Compares the means by which cultures solve common human problems. Shows similarities and differences throughout the world in systems of values, family, religion, economics, and politics. Students are asked to consider future cultural conditions. Uses a video format. (SS) (Bacc Core Course)

ANTH 199. SPECIAL STUDIES (1-3). This course is repeatable for a maximum of 3 credits.

ANTH 208. *WESTERN CULTURE STUDY ABROAD (3). Overseas study of the history and contemporary form of important features of Western culture. Based on at least 10 weeks of studying abroad. **CROSSLISTED** as LING 208. (Bacc Core Course) **PREREQS:** Must be arranged with instructor prior to registration. Enrolled in Study Abroad program.

ANTH 209. *CULTURAL DIVERSITY STUDY ABROAD (3). Overseas study of non-Western cultures. Based on at least 10 weeks of studying abroad. **CROSSLISTED** as LING 209. (Bacc Core Course) **PREREQS:** Must be arranged with instructor prior to registration. Enrolled in Study Abroad program.

ANTH 210. *COMPARATIVE CULTURES (3). Compares the cultures originating in Asia, Africa, and precolonial Australia, Oceania, and North and South America. Introduces method and theory for comparative cultural analysis from historical, ethnographic, and indigenous viewpoints. Considers the contribution and influences of minority and ethnic groups on the mainstream culture in nation states. Summarizes the characteristics of cultures in the major world culture areas. (Bacc Core Course)

ANTH 230. TIME TRAVELERS (3). Introduction to the historical developments of modern archaeology. The often romanticized public image of archaeology will be contrasted with scientific reality. The nature of archaeological data, modern field methods, analytical techniques, and theoretical background will be reviewed in order to illustrate how the unwritten record of human cultural behavior is deciphered. (SS)

ANTH 240. INTRODUCTION TO BIOLOGICAL ANTHROPOLOGY (3). An investigation of the origin of modern people (*Homo sapiens*) in a historical context; review of key discoveries and current research on the relationships between humans and other primates; exploration of contrasting views of humanity. (SS)

ANTH 251. *LANGUAGE IN THE USA (3). Examines the linguistic aspects of ethnic, class, and gender differences in the United States of America, with a focus on language attitudes. Uses both oral and written materials and quantitative and qualitative approaches. (Bacc Core Course) **PREREQS:** Freshman and sophomore standing.

ANTH 251H. *LANGUAGE IN THE USA (3). Examines the linguistic aspects of ethnic, class, and gender differences in the United States of America, with a focus on language attitudes. Uses both oral and written materials and quantitative and qualitative approaches. (Bacc Core Course) **PREREQS:** Freshman and sophomore standing. Honors College approval required.

ANTH 311. *PEOPLES OF THE WORLD-NORTH AMERICA (3). Survey of peoples around the world. Early settlement, cultural history, ecological adaptations, population, family and gender roles, religious ideology, political and economic systems, modern social changes, and contemporary issues pertaining to indigenous peoples in culturally distinct regions of the world. Emphasis is placed on dispelling stereotypic images, both past and present. (NC) (Bacc Core Course) **PREREQS:** ANTH 110 or ANTH 210 or completion of social processes and institutions requirement.

ANTH 311H. *PEOPLES WORLD-NORTH AMERICA (3). Survey of peoples around the world. Early settlement, cultural history, ecological adaptations, population, family and gender roles, religious ideology, political and economic systems, modern social changes, and contemporary issues pertaining to indigenous peoples in culturally distinct regions of the world. Emphasis is placed on dispelling stereotypic images, both past and present. (NC) (Bacc Core Course) **PREREQS:** ANTH 110 or ANTH 210 or completion of social processes and institutions requirement and Honors College approval required.

ANTH 312. *PEOPLES OF THE WORLD-EUROPE (3). Survey of peoples around the world. Early settlement, cultural history, ecological adaptations, population, family and gender roles, religious ideology, political and economic systems, modern social changes, and contemporary issues pertaining to indigenous peoples in culturally distinct regions of the world. Emphasis is placed on dispelling stereotypic images, both past and present. (Bacc Core Course) **PREREQS:** ANTH 110 or ANTH 210 or completion of social processes and institutions requirement.

ANTH 312H. *PEOPLES OF THE WORLD-EUROPE (3). Survey of peoples around the world. Early settlement, cultural history, ecological adaptations, population, family and gender roles, religious ideology, political and economic systems, modern social changes, and contemporary issues pertaining to indigenous peoples in culturally distinct regions of the world. Emphasis is placed on dispelling stereotypic images, both past and present. (Bacc Core Course) **PREREQS:** ANTH 110 or ANTH 210 or completion of social processes and institutions requirement. Honors College approval required.

ANTH 313. *PEOPLES OF THE WORLD-LATIN AMERICA (3). Survey of peoples around the world. Early settlement, cultural history, ecological adaptations, population, family and gender roles, religious ideology, political and economic systems, modern social changes, and contemporary issues pertaining to indigenous peoples in culturally distinct regions of the world. Emphasis is placed on dispelling stereotypic images, both past and present. (NC) (Bacc Core Course) **PREREQS:** ANTH 110 or ANTH 210 or completion of social processes and institutions requirement.

ANTH 314. *PEOPLES OF THE WORLD-MIDDLE EAST (3). Survey of peoples around the world. Early settlement, cultural history, ecological adaptations, population, family and gender roles, religious ideology, political and economic systems, modern social changes, and contemporary issues pertaining to indigenous peoples in culturally distinct regions of the world. Emphasis is placed on dispelling stereotypic images, both past and present. (NC) (Bacc Core Course) **PREREQS:** ANTH 110 or ANTH 210 or completion of social processes and institutions requirement.

ANTH 314H. *PEOPLES OF THE WORLD-MIDDLE EAST (3). Survey of peoples around the world. Early settlement, cultural history, ecological adaptations, population, family and gender roles, religious ideology, political and economic systems, modern social changes, and contemporary issues pertaining to indigenous peoples in culturally distinct regions of the world. Emphasis is placed on dispelling stereotypic images, both past and present. (NC) (Bacc Core Course) **PREREQS:** ANTH 110 or ANTH 210 or completion of social

processes and institutions requirement. Honors College approval required.

ANTH 315. *PEOPLES OF THE WORLD-AFRICA (3). Survey of peoples around the world. Early settlement, cultural history, ecological adaptations, population, family and gender roles, religious ideology, political and economic systems, modern social changes, and contemporary issues pertaining to indigenous peoples in culturally distinct regions of the world. Emphasis is placed on dispelling stereotypic images, both past and present. (NC) (Bacc Core Course) **PREREQS:** ANTH 110 or ANTH 210 or completion of social processes and institutions requirement.

ANTH 316. *PEOPLES OF THE WORLD-SOUTH AND SOUTHEAST ASIA (3). Survey of peoples around the world. Early settlement, cultural history, ecological adaptations, population, family and gender roles, religious ideology, political and economic systems, modern social changes, and contemporary issues pertaining to indigenous peoples in culturally distinct regions of the world. Emphasis is placed on dispelling stereotypic images, both past and present. (NC) (Bacc Core Course) **PREREQS:** ANTH 110 or ANTH 210 or completion of social processes and institutions requirement.

ANTH 317. *PEOPLES OF THE WORLD-PACIFIC (3). Survey of peoples around the world. Early settlement, cultural history, ecological adaptations, population, family and gender roles, religious ideology, political and economic systems, modern social changes, and contemporary issues pertaining to indigenous peoples in culturally distinct regions of the world. Emphasis is placed on dispelling stereotypic images, both past and present. (NC) (Bacc Core Course) **PREREQS:** ANTH 110 or ANTH 210 or completion of social processes and institutions requirement.

ANTH 318. *PEOPLES OF THE WORLD-CHINA (3). Survey of peoples around the world. Early settlement, cultural history, ecological adaptations, population, family and gender roles, religious ideology, political and economic systems, modern social changes, and contemporary issues pertaining to indigenous peoples in culturally distinct regions of the world. Emphasis is placed on dispelling stereotypic images, both past and present. (NC) (Bacc Core Course) **PREREQS:** ANTH 110 or ANTH 210 or completion of social processes and institutions requirement.

ANTH 319. *PEOPLES OF THE WORLD-JAPAN AND KOREA (3). Survey of peoples around the world. Early settlement, cultural history, ecological adaptations, population, family and gender roles, religious ideology, political and economic systems, modern social changes, and contemporary issues pertaining to indigenous peoples in culturally distinct regions of the world. Emphasis is placed on dispelling stereotypic images, both past and present. (NC) (Bacc Core Course) **PREREQS:** ANTH 110 or ANTH 210 or completion of social processes and institutions requirement.

ANTH 330. *EVOLUTION OF PEOPLE, TECHNOLOGY, AND SOCIETY (3). Overview of the evolution and prehistory of the human species, including the development and interaction of human biology, technology, and society. (SS) (Bacc Core Course) **PREREQS:** Sophomore standing.

ANTH 331. MESOAMERICAN PREHISTORY (3). Explores the archaeology and prehistory of Mesoamerica from Paleo-Indian times through the Olmec, Maya, Zapotec, and Aztec cultures to the Spanish Conquest. Themes include the transition to settled agriculture, emergence of social inequality and political authority, the role of the natural environment, and the rich cultural heritage of Mesoamerican civilizations. **PREREQS:** Students need to understand the fundamentals of archaeology.

ANTH 345. *BIOLOGICAL AND CULTURAL CONSTRUCTIONS OF RACE (3). The social, cultural, and historical context of human biological

diversity in the United States. Students become acquainted with primary resources relating to biological diversity within the modern human species and will offer a critical perspective on racial/ethnic categorization of that diversity. (Bacc Core Course) **PREREQS:** Sophomore standing and completion of one anthropology course.

ANTH 345H. *BIOLOGICAL AND CULTURAL CONSTRUCTIONS OF RACE (3). The social, cultural, and historical context of human biological diversity in the United States. Students become acquainted with primary resources relating to biological diversity within the modern human species and will offer a critical perspective on racial/ethnic categorization of that diversity. (Bacc Core Course) **PREREQS:** Sophomore standing and completion of one anthropology course and Honors College approval required.

ANTH 350. LANGUAGE, CULTURE AND SOCIETY (4). An examination of the communicative functions of language and the role of language in the construction of social relations. Covers the origins, structure, and diversity of language. Explores the relationships between language and thought and the use of linguistic models in the study of culture. (SS) **PREREQS:** 3 credits of social science.

ANTH 352. *ANTHROPOLOGY, HEALTH, AND ENVIRONMENT (3). Major threats to human health are increasingly linked to global environmental changes. This course engages medical and environmental anthropology research to critically explore the values, meanings and ideologies associated with ecological and public health issues in given localities throughout the world. (Bacc Core Course)

ANTH 361. FOOD STUDIES IN A SOCIAL JUSTICE PERSPECTIVE (4). Contemporary food systems are examined from a cultural and social justice perspective. The human right to food as recognized by the United Nations serves as the justice grounding point. Impediments to realizing the right to food will be examined in national and international contexts. Lec/rec.

ANTH 370. ^CULTURAL ANTHROPOLOGY: CONCEPTS AND METHODS (4). Students learn the basic theories, concepts, and methods of cultural anthropology. Designed for anthropology majors, the class involves students in understanding, critiquing, and participating in the approaches and issues central to anthropologists past and present. As a writing intensive course, students practice conducting and writing up interviews, critiquing anthropological issues, and analyzing real-life material for cultural values and power differences. Students write a major research paper on a topic of interest relevant to anthropology, using anthropology sources. (Writing Intensive Course) **PREREQS:** ANTH 110 or completion of social processes and institutions requirement.

ANTH 371. RESEARCH METHODS IN CULTURAL ANTHROPOLOGY (4). Designed for anthropology majors, this course involves students in learning about and practicing anthropological research methods. Students practice ethnographic fieldwork by conducting participant observation and interviews, writing fieldnotes, analyzing real-life material for cultural values and power differences, and writing up a research paper. **PREREQS:** ANTH 110

ANTH 373. APPROACHES TO SOCIAL JUSTICE (3). Students study various ways of thinking about social justice and evaluate these in case studies and current events. As a basis for the Social Justice minor, students write a research paper on the theoretical and practical aspects of a social justice issue. **CROSSLISTED** as ES 373, WGSS 373, WLC 373.

ANTH 380. *CULTURES IN CONFLICT (3). Communication and commerce draw East and West, industrial and pre-industrial, state and stateless societies together. Beliefs and values clash and complement one another. Explores

the processes of intercultural contact, cross-cultural interaction, and the consequences of global penetration of European-American culture. Evaluates theoretical explanations for cultural persistence and change. (SS) (Bacc Core Course) **PREREQS:** ANTH 110 or completion of non-Western cultures requirement.

ANTH 380H. *CULTURES IN CONFLICT (3). Communication and commerce draw East and West, industrial and pre-industrial, state and stateless societies together. Beliefs and values clash and complement one another. Explores the processes of intercultural contact, cross-cultural interaction, and the consequences of global penetration of European-American culture. Evaluates theoretical explanations for cultural persistence and change. (SS) (Bacc Core Course) **PREREQS:** ANTH 110 or completion of non-Western cultures requirement. Honors College approval required.

ANTH 383. *INTRODUCTION TO MEDICAL ANTHROPOLOGY (3). Examines human health and healing systems from evolutionary and cross-cultural perspectives. Using a case study approach, this class explores individual- and population-level experiences of illness and healing, while providing students with the tools to evaluate global disease patterns and international health promotion and education programs. (Bacc Core Course)

ANTH 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ANTH 399H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

ANTH 401. RESEARCH (1-6). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANTH 402. INDEPENDENT STUDY (1-6). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANTH 403. THESIS (1-6). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANTH 405. READING AND CONFERENCE (1-6). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANTH 405H. READING AND CONFERENCE (1-6). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

ANTH 406. PROJECTS (1-6). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANTH 407. SEMINAR (1-3). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANTH 407H. SEMINAR (1-3). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

ANTH 409. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

ANTH 410. INTERNSHIP (1-16). Opportunities for students at junior and first-term senior class levels to take advantage of off-campus work experiences during regular term sessions for academic credit. Allows students to broaden and deepen their understanding and appreciation of the value of their academic activity. Internship is supervised and evaluated by individual faculty members. This course is repeatable for a maximum of 16 credits. **PREREQS:** 6 credits of anthropology.

ANTH 420. WORLD CULTURES—TOPICS (4). In-depth study of world cultures. Early settlement, cultural history, ecological adaptations, population, family and gender roles, religious ideology, political and economic systems, modern social changes, and contemporary issues pertaining to indigenous peoples in culturally distinct regions of the world.

Emphasis is placed on dispelling stereotypic images, both past and present. Includes three hours of lecture and one hour of seminar. Cannot be taken if student is taking or has completed the 300-level course in the same geographical area. Graded P/N. **PREREQS:** 9 credits of social science including 3 credits of anthropology or graduate standing.

ANTH 421. ANALYSIS OF LITHIC TECHNOLOGIES (3). Covers the principles, procedures, and purpose of archaeological lithic analysis and the anthropological interpretation of lithic technologies used by prehistoric hunter-gatherers. **PREREQS:** ANTH 230

ANTH 422. HISTORIC MATERIALS ANALYSIS (3). Introduction to the analytical and descriptive methods and techniques used by historical archeologists to study late 18th through 20th century machine and handmade objects. **PREREQS:** ANTH 230

ANTH 423. METHOD AND THEORY IN HISTORICAL ARCHAEOLOGY (3). Examines the origins and growth of historical archaeology in the Americas. Students will critically learn about the linkages with history and anthropology and explore the theoretical underpinnings of historical archaeology.

ANTH 424. SETTLEMENT ARCHAEOLOGY (3). Explores the evolution of the theoretical underpinnings and field methods of settlement archaeology as well as the refinement of the meaning of "settlement archaeology" over time.

ANTH 425. CERAMIC ANALYSIS IN ARCHAEOLOGY (3). Provides fundamental practical skills and theoretical perspectives for the analysis and interpretation of archaeological ceramics. On the practical side, students will learn both basic and advanced techniques for describing and analyzing pottery assemblages encountered by field archaeologists. On the theoretical side, the course will explore the diversity of research questions in which pottery can play a critical role, as well as the various ways in which ceramic data can be interpreted. Lec/lab. **PREREQS:** ANTH 230

ANTH 430. TOPICS IN ARCHAEOLOGY (1-4). Recent advances in archaeology and their application to special fields of study. Topics vary from term to term. This course is repeatable for a maximum of 99 credits. **PREREQS:** (ANTH 230 or ANTH 330) and /or equivalent.

ANTH 432. *THE ARCHAEOLOGY OF DOMESTICATION AND URBANIZATION (3). Reviews the development of culture in the Old and New Worlds with special emphasis placed on the when, where, and how of early domestication of plants and animals. Examines the process of urbanization. (Bacc Core Course) **PREREQS:** 6 credits of anthropology.

ANTH 433. FIRST AMERICANS, LAST FRONTIERS (3). The initial human occupation of the Western Hemisphere is explored with particular emphasis on northeast Siberian cultural progenitors, routes and timing of entry into the Americas, population dispersal theory, the paleoenvironmental record, and human cultural responses to the conditions of the last frontier prior to 8,000 years ago. **PREREQS:** 6 credits of anthropology.

ANTH 434. NORTH AMERICA AFTER THE ICE AGE (3). The development of regional hunting and gathering adaptive strategies in North America from 8000 B.C. to the historic period are examined against a backdrop of changing climate, natural disasters, population growth, and human invention. **PREREQS:** ANTH 433 or 6 credits of anthropology.

ANTH 435. CULTURAL RESOURCES: POLICY AND PROCEDURES (3). Description and analysis of requirements and demands of cultural resource management. Historical development of cultural resource laws and appropriate field

techniques and strategies to implement legislation. **PREREQS:** ANTH 230 and /or instructor approval required.

ANTH 436. NORTHWEST PREHISTORY (3). Materials and theories relating to prehistoric aboriginal cultures of the Northwest. Evaluation of different theories on the origins and adaptations of prehistoric populations to ecological zones within the Northwest; comparisons of the cultural development through prehistoric times of the Columbia Plateau, intermontane and coastal zones of Oregon, Washington, and British Columbia. Special emphasis on the theories of origin, subsequent development of prehistoric cultures in the Northwest, and the present circumstances of archaeology in the Northwest. **PREREQS:** 6 credits of anthropology.

ANTH 437. GEOARCHAEOLOGY (3). Provides an introduction to geoarchaeological concepts and methods. Emphasis will be placed on the use of geoscientific perspectives and datasets to solve archaeological problems. **PREREQS:** ANTH 230

ANTH 438. ARCHAEOLOGY FIELD SCHOOL (10-12). Practical skills, archaeological methods and techniques including use of equipment, site surveying and mapping techniques, site excavation strategies, record keeping, field cataloging, report writing, and field camp management. **PREREQS:** 6 credits of anthropology and instructor approval required.

ANTH 439. ARCHAEOLOGICAL STUDY OF FORAGING LIFEWAYS (3). Provides an in-depth review of the concepts and approaches employed to study cultural aspects of past foraging peoples using archaeological research methods and theoretical perspectives.

ANTH 440. TOPICS IN PHYSICAL ANTHROPOLOGY (1-4). Recent advances in physical anthropology and their applications to special fields of study. Topics vary from term to term. This course is repeatable for a maximum of 16 credits. **PREREQS:** (ANTH 240 or ANTH 330) and /or general biology or equivalent.

ANTH 441. HUMAN EVOLUTION (4). The evolutionary history of the primate order as it is represented by fossils of the Paleocene through the Holocene. Special attention given to development of the Hominoids in the Miocene, the Australopithecines in the Pliocene, and members of the genus Homo in the Pleistocene. Lec/lab. **PREREQS:** ((ANTH 110 or ANTH 210) and ANTH 240) and /or general biology or equivalent.

ANTH 442. BIOCULTURAL PERSPECTIVES ON HUMAN BIOLOGY (4). Overview of human biology and its various subfields, applications of human biology in areas of nutrition, health, growth, adaptation, and demography. Understanding adaptive variations among populations and individuals in responses to environment, disease, and nutritional stress. **PREREQS:** ANTH 240 and /or ANTH 340 or general biology or equivalent.

ANTH 443. HUMAN OSTEOLOGY LAB (4). Identification and analysis of human skeletal materials in an archaeological context. **PREREQS:** ANTH 240

ANTH 444. NUTRITIONAL ANTHROPOLOGY (4). Examines human nutrition and food systems from comparative, biocultural and evolutionary perspectives. Long-term evolutionary processes are examined within an ecological framework as significant factors affecting human biology and susceptibility to diet-related disease. An emphasis on anthropological methods in nutritional assessment including anthropometry, paleodietary assessment and nutritional participant-observation will provide students with the tools to evaluate human diet from skeletal and fossil collections through contemporary cross-cultural populations. **PREREQS:** (ANTH 110 and (ANTH 240 or ANTH 330))

ANTH 446. FORENSIC ANTHROPOLOGY (3). Concepts and practices in the use of anthropology in legal matters and police cases, especially

involving identification of human remains. Offered alternate years. **PREREQS:** ANTH 443 or equivalent.

ANTH 449. BIOCULTURAL PERSPECTIVES ON HUMAN REPRODUCTION (4). Examines human reproduction and sexuality from the perspective of the New Biocultural Synthesis, a theoretical approach in anthropology that examines the interface of evolved biological, sociocultural and political-economic factors that interact to produce complex human behaviors and biologies. Topics are presented from a life-history perspective where questions related to human reproduction and evolutionary history are examined across the lifespan from mating and conception through elderhood and menopause. Lec/lab.

ANTH 450. TOPICS IN LINGUISTIC ANTHROPOLOGY (1-4). Recent advances in the study of culture and communication and their application to special fields of knowledge. Topics vary from term to term. This course is repeatable for a maximum of 16 credits. **PREREQS:** 3 credits of linguistic anthropology.

ANTH 452. FOLKLORE AND EXPRESSIVE CULTURE (4). The study of folklore/popular culture in its social and historical context. Examines content, structure, communicative potential, and performative aspects of various forms of oral and written expression. Includes familiarization with the analysis of myths, legends, tall tales, proverbs, riddles, and play languages. (FA) **PREREQS:** 3 credits of social science.

ANTH 461. NEUROANTHROPOLOGY (4). The emerging interdisciplinary field of neuroanthropology combines anthropological understandings of human biological and cultural variation with recent findings in neuroscience. Key topics include socialization and enculturation, addiction, ritual, depression, and psychiatric disorders. **PREREQS:** ANTH 240 or ANTH 345 or ANTH 383

ANTH 463. ANTHROPOLOGICAL RESEARCH: PROFESSIONAL AND ETHICAL CONDUCT (4). Examines the history and scope of professional and ethical guidelines in anthropology; critically evaluate major issues involving ethics, confidentiality, and anonymity that academic and professional anthropologists face during their careers. **PREREQS:** At least 6 credits of anthropology courses or graduate standing.

ANTH 465. POPULAR CULTURE: AN ANTHROPOLOGICAL PERSPECTIVE (4). Introduces some of the debates and issues swirling around analyses of late twentieth-, early twenty-first century popular/mass/public/mediated/commercial culture. Learning about its pervasive forms, its origins and effects, how we are situated in it, and how it situates us is vital to understanding the changes that characterize our postmodern world.

ANTH 466. *RURAL ANTHROPOLOGY (4). Concentrates on study of the socio-cultural dynamics in rural communities as they develop in national and global contexts of political and economic change. Includes anthropological readings on rural issues in domestic and international contexts and a research paper on a contemporary rural issue. (Bacc Core Course) **PREREQS:** 3 credits of social science.

ANTH 468. ANTHROPOLOGY OF CHILDHOOD (4). Ethnographies of the organization of children's lives in different cultural contexts are combined with readings on the conceptual and methodological genealogies that have constructed children as research subjects in anthropology. **PREREQS:** 3 credits of social science

ANTH 470. TOPICS IN CULTURAL ANTHROPOLOGY (1-16). Covers recent advances in cultural anthropology and their applications to the field. Topics vary from term to term. This course is repeatable for a maximum of 16 credits. **PREREQS:** 3 credits of social science.

ANTH 471. CASH, CLASS AND CULTURE: HUNTER-GATHERERS TO CAPITALISM (4). Students explore the cultural and social effects of capitalism in the contemporary world within the larger question of how economics and society intersect and change over time. Special emphases are put on food and work, but students explore the linkages of global forces and local life in a variety of ways. **PREREQS:** 3 credits of social science.

ANTH 472. CONTEMPORARY INDIAN ISSUES (4). Examines the background of Indian treaties and reservations with discussions of present issues such as health care, education, the Indian Child Welfare Act, fishing rights, and religious freedom. Issues are discussed in class with considerable class participation and some role playing. **PREREQS:** 3 credits of social science.

ANTH 473. *GENDER, ETHNICITY, AND CULTURE (4). Study of the practices and ideologies of gender as they intersect with those of ethnicity, race, class, and culture. (Bacc Core Course) **PREREQS:** 3 credits of social science.

ANTH 474. CROSS-CULTURAL HEALTH AND HEALING (4). A comprehensive overview of current issues in global health with particular emphasis on social, cultural, and behavioral interventions. Explores issues of health and development in the international context, focusing on such issues as inequality, structural adjustment, economic development, and community-based approaches to health care, specific cultural beliefs and practices, and the influence of people's perceptions of health, illness, and healing.

ANTH 477. ECOLOGICAL ANTHROPOLOGY (4). Examines past and present interactions between humans and their environments. Emphasizes the concept of system and process of human adaptation. **PREREQS:** Upper-division standing and 3 credits of social science.

ANTH 478. ANTHROPOLOGY OF TOURISM (4). Examines the cultural practices and impacts of tourism in relation to both host and guest communities, and travel itself as part of culture. We will explore theories of tourism and what role anthropology can play in influencing the industry and tourist and host relationships. **PREREQS:** 3 credits of social science.

ANTH 479. ANTHROPOLOGY OF MIGRATION (4). Focuses on the multiple aspects of population movements around the globe. Investigates the history of recent human migration; current theories, trends and policies; as well as issues of immigrant incorporation and anti-immigrant politics. **PREREQS:** 3 credits of social science.

ANTH 480. TOPICS IN APPLIED ANTHROPOLOGY (1-4). Recent advances in applied anthropology and their application to special fields of study. Topics vary from term to term. This course is repeatable for a maximum of 16 credits. **PREREQS:** 3 credits of social science.

ANTH 481. *NATURAL RESOURCES AND COMMUNITY VALUES (3). Investigates relations between human communities and the values of community members. Resource issues integrate concepts from social science, economics, and ecology. (Bacc Core Course) **PREREQS:** 3 credits of social science.

ANTH 482. *ANTHROPOLOGY OF INTERNATIONAL DEVELOPMENT (4). Examines the ideological and theoretical bases of world assistance programs and their effects on different sectors and classes, including women. Causes of world hunger in terms of agronomic, mainstream economic and radical economic paradigms are developed and contrasted. (Bacc Core Course) **PREREQS:** Senior standing.

ANTH 483. ADVANCED MEDICAL ANTHROPOLOGY (4). An overview of anthropological studies of the health of human communities from a biological and behavioral perspective. Topics include prehistory of disease,

cultural perspectives on causation of disease and approaches to healing; anthropological approach to international health issues; and case studies. **PREREQS:** (ANTH 110 or ANTH 210) and (ANTH 240 or ANTH 330)

ANTH 484. *WEALTH AND POVERTY (3). Summarizes the distribution of wealth observed cross-culturally and through time. Determines the relation between wealth distribution and economic productivity. Shows the impact of industrialization and economic wealth distribution in Western civilization and cross-culturally. Evaluates how cultural practices affect wealth distribution in Western and non-Western societies. (Bacc Core Course) **PREREQS:** 3 credits of social science.

ANTH 485. CAPSTONE IN SOCIAL JUSTICE (2). Working with an advisor from the Social Justice minor, students conduct research to synthesize and extend analysis of a particular social justice issue, building on three previous papers or projects. Results are presented in a 10-15 page paper and a public poster, presentation or website. CROSSLISTED as ES 485, WGSS 485, WLC 485. This course is repeatable for a maximum of 4 credits. **PREREQS:** (ANTH 373 or ES 373 or WGSS 373 or WLC 373) and (ANTH 410 or ES 410 or WGSS 410 or WLC 410)

ANTH 486. ANTHROPOLOGY OF FOOD (2-6). The role of food in human cultures, both past and present. Includes discussion of different food procurement styles, social movements and the political economy of food. Looks at the symbolic aspects of food as well as its relationship with the environment. This course is repeatable for a maximum of 6 credits. **PREREQS:** 3 credits of social science.

ANTH 487. ^LANGUAGE IN GLOBAL CONTEXT (4). Deals with practical uses of linguistics in the global political arena. Explores use of official vs. unofficial languages, language standardization, the preservation of dying languages; problems in learning first and second languages, and the relevance of linguistic knowledge to education and cross-cultural communication. (Writing Intensive Course) **PREREQS:** (ANTH 251 or ANTH 350) and /or some knowledge of linguistic structure or graduate standing.

ANTH 488. *BUSINESS AND ASIAN CULTURE (3). Examines the mutual influence of business organization and culture in Asia. Starts with the premise that a business organization contains a set of values. These values are analyzed as to their effect on society in general and some Asian societies in particular, including Japan, China, Korea, India, and Indonesia. A second area of investigation is the influence of Asian societies on the organization and practice of Western businesses both in Asia and the West. (Bacc Core Course) **PREREQS:** 3 credits of social science.

ANTH 489. ANTHROPOLOGY OF BUSINESS (3). Students are exposed to the methods and perspectives used by anthropologists working in business. How does anthropology contribute in such areas as product development, workplace organization and communication, marketing and interfacing with technology? Students do a lengthy project in one of these areas and present it as if in a corporate setting.

ANTH 490. TOPICS IN METHODOLOGY (1-4). Recent advances in anthropological methodologies and their application to special fields of study. Topics vary from term to term. This course is repeatable for a maximum of 16 credits. **PREREQS:** 6 credits of anthropology or graduate standing.

ANTH 492. ARCHAEOLOGICAL LABORATORY METHODS (1-3). Provides information on the basics of archaeological laboratory work. Students learn the day-to-day operations of a lab, how to classify and catalog artifacts, and how to do artifact analysis, research hypothesis. **PREREQS:** 6 credits of anthropology or graduate standing.

ANTH 494. LINGUISTIC ANTHROPOLOGY LAB (1-3). A training and practicum in the elicitation, transcription and analysis of language. **PREREQS:** ANTH 350 and /or graduate standing.

ANTH 497. ARCHAEOLOGICAL FIELD METHODS (1-3). Archaeological field strategies emphasizing reconnaissance and survey. Application of field equipment and project management.

ANTH 498. ORAL TRADITIONS (1-3). Method of examining unwritten culture preserved in speech, including local history, folklore, and songs passed from one generation to another. May include the use of life history, genealogy, and other means of collecting information. Attention is given to ethics, legal issues, and the process of transcription. **PREREQS:** ANTH 350 and ANTH 452* or graduate standing

ANTH 499. SPECIAL TOPICS IN ANTHROPOLOGY (1-16). This course is repeatable for a maximum of 16 credits.

ANTH 499H. SPECIAL TOPICS IN ANTHROPOLOGY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

ANTH 501. RESEARCH (1-6). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANTH 502. INDEPENDENT STUDY (1-6). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANTH 503. THESIS (1-12). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

ANTH 505. READING AND CONFERENCE (1-6). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANTH 506. PROJECTS (1-6). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANTH 507. SEMINAR (1-3). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANTH 509. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

ANTH 510. GRADUATE INTERNSHIP (1-16). Opportunities for students at junior and first-term senior class levels to take advantage of off-campus work experiences during regular term sessions for academic credit. Allows students to broaden and deepen their understanding and appreciation of the value of their academic activity. Internship is supervised and evaluated by individual faculty members. This course is repeatable for a maximum of 16 credits. **PREREQS:** 6 credits of anthropology.

ANTH 521. ANALYSIS OF LITHIC TECHNOLOGIES (3). Covers the principles, procedures, and purpose of archaeological lithic analysis and the anthropological interpretation of lithic technologies used by prehistoric hunter-gatherers. This course is repeatable for a maximum of 6 credits. **PREREQS:** ANTH 230.

ANTH 522. HISTORIC MATERIALS ANALYSIS (3). Introduction to the analytical and descriptive methods and techniques used by historical archeologists to study late 18th through 20th century machine and handmade objects. **PREREQS:** ANTH 230

ANTH 523. METHOD AND THEORY IN HISTORICAL ARCHAEOLOGY (3). Examines the origins and growth of historical archaeology in the Americas. Students will critically learn about the linkages with history and anthropology and explore the theoretical underpinnings of historical archaeology.

ANTH 524. SETTLEMENT ARCHAEOLOGY (3). Explores the evolution of the theoretical

underpinnings and field methods of settlement archaeology as well as the refinement of the meaning of "settlement archaeology" over time.

ANTH 525. CERAMIC ANALYSIS IN ARCHAEOLOGY (3). Provides fundamental practical skills and theoretical perspectives for the analysis and interpretation of archaeological ceramics. On the practical side, students will learn both basic and advanced techniques for describing and analyzing pottery assemblages encountered by field archaeologists. On the theoretical side, the course will explore the diversity of research questions in which pottery can play a critical role, as well as the various ways in which ceramic data can be interpreted. Lec/lab. **PREREQS:** ANTH 230

ANTH 530. TOPICS IN ARCHAEOLOGY (1-4). Recent advances in archaeology and their application to special fields of study. Topics vary from term to term. This course is repeatable for a maximum of 16 credits. **PREREQS:** ANTH 230 or ANTH 330 or equivalent.

ANTH 531. ARCHAEOLOGICAL THEORY (3). Historical development of archaeological field techniques and theoretical concepts with an emphasis on modern method and theory in North American archaeology. **PREREQS:** ANTH 230 or equivalent.

ANTH 533. FIRST AMERICANS, LAST FRONTIERS (3). The initial human occupation of the Western Hemisphere is explored with particular emphasis on northeast Siberian cultural progenitors, routes and timing of entry into the Americas, population dispersal theory, the paleoenvironmental record, and human cultural responses to the conditions of the last frontier prior to 8,000 years ago. **PREREQS:** 6 credits of anthropology.

ANTH 534. NORTH AMERICA AFTER THE ICE AGE (3). The development of regional hunting and gathering adaptive strategies in North America from 8000 B.C. to the historic period are examined against a backdrop of changing climate, natural disasters, population growth, and human invention. **PREREQS:** ANTH 433 or 6 credits of anthropology.

ANTH 535. CULTURAL RESOURCES: POLICY AND PROCEDURES (3). Description and analysis of requirements and demands of cultural resource management. Historical development of cultural resource laws and appropriate field techniques and strategies to implement legislation. **PREREQS:** ANTH 431 or instructor approval required

ANTH 536. NORTHWEST PREHISTORY (3). Materials and theories relating to prehistoric aboriginal cultures of the Northwest. Evaluation of different theories on the origins and adaptations of prehistoric populations to ecological zones within the Northwest; comparisons of the cultural development through prehistoric times of the Columbia Plateau, intermontane and coastal zones of Oregon, Washington, and British Columbia. Special emphasis on the theories of origin, subsequent development of prehistoric cultures in the Northwest, and the present circumstances of archaeology in the Northwest. **PREREQS:** 6 credits of anthropology.

ANTH 537. GEOARCHAEOLOGY (3). Provides an introduction to geoarchaeological concepts and methods. Emphasis will be placed on the use of geoscientific perspectives and datasets to solve archaeological problems. **PREREQS:** ANTH 230

ANTH 538. ARCHAEOLOGY FIELD SCHOOL (1-10). Practical skills, archaeological methods and techniques including use of equipment, site surveying and mapping techniques, site excavation strategies, record keeping, field cataloging, report writing, and field camp management. **PREREQS:** 6 credits of anthropology and instructor approval required.

ANTH 539. ARCHAEOLOGICAL STUDY OF FORAGING LIFEWAYS (3). Provides an in-depth

review of the concepts and approaches employed to study cultural aspects of past foraging peoples using archaeological research methods and theoretical perspectives.

ANTH 540. TOPICS IN PHYSICAL ANTHROPOLOGY (1-4). Recent advances in physical anthropology and their applications to special fields of study. Topics vary from term to term. This course is repeatable for a maximum of 16 credits. **PREREQS:** ANTH 240 or ANTH 330 or general biology or equivalent

ANTH 541. HUMAN EVOLUTION (4). The evolutionary history of the primate order as it is represented by fossils of the Paleocene through the Holocene. Special attention given to development of the Hominoids in the Miocene, the Australopithecines in the Pliocene, and members of the genus Homo in the Pleistocene. Lec/lab. **PREREQS:** (ANTH 110 or ANTH 210) and ANTH 240

ANTH 542. BIOCULTURAL PERSPECTIVES ON HUMAN BIOLOGY (4). Overview of human biology and its various sub fields, applications of human biology in areas of nutrition, health, growth, adaptation, and demography. Understanding adaptive variations among populations and individuals in responses to environment, disease, and nutritional stress. **PREREQS:** ANTH 240 and ANTH 240 or ANTH 340 or general biology or equivalent.

ANTH 543. HUMAN OSTEOLOGY (4). Identification and analysis of human skeletal materials in an archaeological context. **PREREQS:** ANTH 240

ANTH 544. NUTRITIONAL ANTHROPOLOGY (4). Examines human nutrition and food systems from comparative, biocultural and evolutionary perspectives. Long-term evolutionary processes are examined within an ecological framework as significant factors affecting human biology and susceptibility to diet-related disease. An emphasis on anthropological methods in nutritional assessment including anthropometry, paleodietary assessment and nutritional participant-observation will provide students with the tools to evaluate human diet from skeletal and fossil collections through contemporary cross-cultural populations. **PREREQS:** ANTH 110 and (ANTH 240 or ANTH 330)

ANTH 547. METHODS IN FOOD IN CULTURE AND SOCIAL JUSTICE STUDIES (4). Exposes graduate students to the methodological approaches and methods used in guiding empirical research on the socio-cultural aspects of food, focusing on vulnerable populations, food security, procurement, foodways, disasters, and climate change. Methodological approaches and methods as evidenced in peer-reviewed publications is the grounding for the course. **PREREQS:** Graduate standing.

ANTH 549. BIOCULTURAL PERSPECTIVES ON HUMAN REPRODUCTION (4). Examines human reproduction and sexuality from the perspective of the New Biocultural Synthesis, a theoretical approach in anthropology that examines the interface of evolved biological, sociocultural and political-economic factors that interact to produce complex human behaviors and biologies. Topics are presented from a life-history perspective where questions related to human reproduction and evolutionary history are examined across the lifespan from mating and conception through elderhood and menopause. Lec/lab.

ANTH 550. TOPICS IN LINGUISTIC ANTHROPOLOGY (1-4). Recent advances in the study of culture and communication and their application to special fields of knowledge. Topics vary from term to term. This course is repeatable for a maximum of 16 credits. **PREREQS:** 3 credits of linguistic anthropology.

ANTH 551. LINGUISTIC ANTHROPOLOGY (4). The study of language in social context including the relationships between language and

age, gender, personality, religion, ethnicity and social class. Examines pidgins, creoles, dialects, genres and the processes of language change. **PREREQS:** ANTH 251 or ANTH 350 or graduate standing.

ANTH 552. FOLKLORE AND EXPRESSIVE CULTURE (4). The study of folklore/popular culture in its social and historical context. Examines content, structure, communicative potential, and performative aspects of various forms of oral and written expression. Includes familiarization with the analysis of myths, legends, tall tales, proverbs, riddles, and play languages. **PREREQS:** ANTH 251 or ANTH 350 or graduate standing. **COREQS:** ANTH 598

ANTH 561. NEUROANTHROPOLOGY (4). The emerging interdisciplinary field of neuroanthropology combines anthropological understandings of human biological and cultural variation with recent findings in neuroscience. Key topics include socialization and enculturation, addiction, ritual, depression, and psychiatric disorders. **PREREQS:** ANTH 240 or ANTH 345 or ANTH 383

ANTH 563. ANTHROPOLOGICAL RESEARCH: PROFESSIONAL AND ETHICAL CONDUCT (4). Examines the history and scope of professional and ethical guidelines in anthropology; critically evaluate major issues involving ethics, confidentiality, and anonymity that academic and professional anthropologists face during their careers. **PREREQS:** At least 6 credits of anthropology courses or graduate standing.

ANTH 565. POPULAR CULTURE: AN ANTHROPOLOGICAL PERSPECTIVE (4). Introduces some of the debates and issues swirling around analyses of late twentieth-, early twenty-first century popular/mass/public/mediated/commercial culture. Learning about its pervasive forms, its origins and effects, how we are situated in it, and how it situates us is vital to understanding the changes that characterize our postmodern world.

ANTH 566. RURAL ANTHROPOLOGY (4). Concentrates on study of the socio-cultural dynamics in rural communities as they develop in national and global contexts of political and economic change. Includes anthropological readings on rural issues in domestic and international contexts and a research paper on a contemporary rural issue. **PREREQS:** 3 credits of social science.

ANTH 567. AGRI-FOOD MOVEMENTS (4). Investigates the origins and contemporary status of producer and consumer food movements including, but not limited to, organics, agricultural labor movements, animal welfare, vegetarian and vegan movements, farmers' markets, and permaculture.

ANTH 568. ANTHROPOLOGY OF CHILDHOOD (4). Ethnographies of the organization of children's lives in different cultural contexts are combined with readings on the conceptual and methodological genealogies that have constructed children as research subjects in anthropology. **PREREQS:** 3 credits of social science

ANTH 570. TOPICS IN CULTURAL ANTHROPOLOGY (1-16). Covers recent advances in cultural anthropology and their applications to the field. Topics vary from term to term. This course is repeatable for a maximum of 16 credits. **PREREQS:** 3 credits of social science.

ANTH 571. CASH, CLASS AND CULTURE: HUNTER-GATHERERS TO CAPITALISM (4). Students explore the cultural and social effects of capitalism in the contemporary world within the larger question of how economics and society intersect and change over time. Special emphases are put on food and work, but students explore the linkages of global forces and local life in a variety of ways. **PREREQS:** 3 credits of social science.

ANTH 572. CONTEMPORARY INDIAN ISSUES (4). Examines the background of Indian treaties and reservations with discussions of present issues such as health care, education, the Indian Child Welfare Act, fishing rights, and religious freedom. Issues are discussed in class with considerable class participation and some role playing. **PREREQS:** 3 credits of social science.

ANTH 573. GENDER, ETHNICITY, AND CULTURE (3). Study of the practices and ideologies of gender as they intersect with those of ethnicity, race, class, and culture. **PREREQS:** 3 credits of social science.

ANTH 574. CROSS-CULTURAL HEALTH AND HEALING (4). A comprehensive overview of current issues in global health with particular emphasis on social, cultural, and behavioral interventions. Explores issues of health and development in the international context, focusing on such issues as inequality, structural adjustment, economic development, and community-based approaches to health care, specific cultural beliefs and practices, and the influences of people's perceptions of health, illness, and healing.

ANTH 575. THEORY OF CULTURE (3). Core ideas in the discipline of anthropology. Examination of the contributions to anthropological method and theory of the major schools of thought in the history of anthropology. **PREREQS:** 9 credits of upper-division social science, including at least one 400-level anthropology course.

ANTH 576. ADVANCED ANTHROPOLOGICAL THEORY SEMINAR (3). Investigates theories used by current anthropologists to explicate issues of concern in a world of movement, fragmentation, global-local interactions, individuation via state and media unequal power relations, and neoliberal agendas. Students will participate in discussions, essays and a paper that links these theories to their research topics for theses or dissertations. **PREREQS:** Must be a PhD student or have taken ANTH 575.

ANTH 577. ECOLOGICAL ANTHROPOLOGY (4). Examines past and present interactions between humans and their environments. Emphasizes the concept of system and process of human adaptation. **PREREQS:** Upper-division standing and 3 credits of social science.

ANTH 578. ANTHROPOLOGY OF TOURISM (4). Examines the cultural practices and impacts of tourism in relation to both host and guest communities, and travel itself as a part of culture. We will explore theories of tourism and what role anthropology can play in influencing the industry and tourist and host relationships. **PREREQS:** 3 credits of social science.

ANTH 579. ANTHROPOLOGY OF MIGRATION (4). Focuses on the multiple aspects of population movements around the globe. Investigates the history of recent human migration; current theories, trends and policies; as well as issues of immigrant incorporation and anti-immigrant politics. **PREREQS:** 3 credits of social science.

ANTH 580. TOPICS IN APPLIED ANTHROPOLOGY (1-4). Recent advances in applied anthropology and their application to special fields of study. Topics vary from term to term. This course is repeatable for a maximum of 16 credits. **PREREQS:** 3 credits of social science.

ANTH 581. NATURAL RESOURCES AND COMMUNITY VALUES (4). Investigates relations between human communities and the values of community members. Resource issues integrate concepts from social science, economics, and ecology. **PREREQS:** 3 credits of social science.

ANTH 582. ANTHROPOLOGY OF INTERNATIONAL DEVELOPMENT (4). Examines the ideological and theoretical bases of world assistance programs and their effects on different sectors and classes, including women. Causes of world hunger in terms of agronomic, mainstream

economic and radical economic paradigms are developed and contrasted. **PREREQS:** Graduate standing.

ANTH 583. ADVANCED MEDICAL ANTHROPOLOGY (4). An overview of anthropological studies of the health of human communities from a biological and behavioral perspective. Topics include prehistory of disease, cultural perspectives on causation of disease and approaches to healing; anthropological approach to international health issues; and case studies. **PREREQS:** (ANTH 110 or ANTH 210) and (ANTH 240 or ANTH 330)

ANTH 584. WEALTH AND POVERTY (3). Summarizes the distribution of wealth observed cross-culturally and through time. Determines the relation between wealth distribution and economic productivity. Shows the impact of industrialization and economic wealth distribution in Western civilization and cross-culturally. Evaluates how cultural practices affect wealth distribution in Western and non-Western societies. **PREREQS:** 3 credits of social science.

ANTH 585. USES OF ANTHROPOLOGY (4). Examines the practical applications of anthropological knowledge in historical and contemporary contexts. Focuses on planned social change and roles of anthropologists in interdisciplinary research and nonacademic settings such as international business, industrial relations, economic and technological development, education, legal institutions, environmental change, minority relations, health care, and cultural preservation. Emphasizes relevance to public policy and ethical issues associated with applications of anthropological knowledge. **PREREQS:** 3 credits of social science.

ANTH 586. ANTHROPOLOGY OF FOOD (2-6). The role of food in human cultures, both past and present. Includes discussion of different food procurement styles, social movements and the political economy of food. Looks at the symbolic aspects of food as well as its relationship with the environment. This course is repeatable for a maximum of 6 credits. **PREREQS:** ANTH 370 recommended or graduate standing.

ANTH 587. LANGUAGE IN GLOBAL CONTEXT (4). Deals with practical uses of linguistics in the global political arena. Explores use of official vs. unofficial languages, language standardization, the preservation of dying languages; problems in learning first and second languages, and the relevance of linguistic knowledge to education and cross-cultural communication. **PREREQS:** ANTH 251 or ANTH 350 or some knowledge of linguistic structure or graduate standing.

ANTH 588. BUSINESS AND ASIAN CULTURE (3). Examines the mutual influence of business organization and culture in Asia. Starts with the premise that a business organization contains a set of values. These values are analyzed as to their effect on society in general and some Asian societies in particular, including Japan, China, Korea, India, and Indonesia. A second area of investigation is the influence of Asian societies on the organization and practice of Western businesses both in Asia and the West. **PREREQS:** 3 credits of social science.

ANTH 589. ANTHROPOLOGY OF BUSINESS (3). Students are exposed to the methods and perspectives used by anthropologists working in business. How does anthropology contribute in such areas as product development, workplace organization and communication, marketing and interfacing with technology? Students do a lengthy project in one of these areas and present it as if in a corporate setting.

ANTH 590. TOPICS IN METHODOLOGY (1-4). Recent advances in anthropological methodologies and their application to special fields of study. Topics vary from term to term. This course is repeatable for a maximum of 16 credits. **PREREQS:** 6 credits anthropology or graduate standing.

ANTH 591. ETHNOGRAPHIC METHODS (4). Cultural descriptions are produced through systematic observation, elicitation, and analysis to achieve proximity to the insider's point of view. Covers techniques of interviewing, validating, and interpreting cultural data. Allows students to practice what they have learned. **PREREQS:** 6 credits of anthropology or graduate standing.

ANTH 592. ARCHAEOLOGICAL LABORATORY METHODS (1-3). Provides information on the basics of archaeological laboratory work. Students learn the day-to-day operations of a lab, how to classify and catalog artifacts, and how to do artifact analysis. **PREREQS:** 6 credits of anthropology or graduate standing.

ANTH 593. STATISTICAL APPLICATIONS IN ANTHROPOLOGY (1-3). Develops the skills necessary to use statistical software to analyze and interpret numerical data. Covers descriptive statistics, correlation, and multivariate statistical procedures. Evaluate the adequacy of data for parametric and nonparametric statistical tests. **PREREQS:** 6 credits of anthropology or graduate standing.

ANTH 594. LINGUISTIC ANTHROPOLOGY LAB (1-3). A training and practicum in the elicitation, transcription and analysis of language. **PREREQS:** ANTH 350 or graduate standing.

ANTH 595. ANTHROPOLOGICAL RESEARCH DESIGN (4). Critical examination of research design and methodology in anthropology; analysis of methods and procedures of research in the subfields of anthropology. **PREREQS:** 9 credits of upper-division social science, including at least one 400-level anthropology course.

ANTH 597. ARCHAEOLOGICAL FIELD METHODS (1-3). Archaeological field strategies emphasizing reconnaissance and survey. Application of field equipment and project management.

ANTH 598. ORAL TRADITIONS (1-3). Method of examining unwritten culture preserved in speech, including local history, folklore, and songs passed from one generation to another. May include the use of life history, genealogy, and other means of collecting information. Attention is given to ethics, legal issues, and the process of transcription. **PREREQS:** ANTH 350 and ANTH 452* or graduate standing

ANTH 599. SPECIAL TOPICS IN ANTHROPOLOGY (1-16). This course is repeatable for a maximum of 16 credits.

ANTH 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANTH 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

ANTH 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANTH 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANTH 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANTH 610. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ANTH 699. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ANTH 808. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

■ ARABIC COURSES

ARAB 111. FIRST-YEAR ARABIC (4). Pronunciation, intonation, grammar, reading, writing, listening comprehension and conversation. Initiation to Arabic culture and attitudes. Designed for students with no prior training in Arabic. Native and/or bilingual speakers of Arabic will not receive credit for ARAB 111, ARAB 112, ARAB 113. **PREREQS:** ARAB 111, ARAB 112, ARAB 113 must be taken in order.

ARAB 111H. FIRST-YEAR ARABIC (4). Pronunciation, intonation, grammar, reading, writing, listening comprehension and conversation. Initiation to Arabic culture and attitudes. Designed for students with no prior training in Arabic. Native and/or bilingual speakers of Arabic will not receive credit for ARAB 111H, ARAB 112H, ARAB 113H. **PREREQS:** ARAB 111H, ARAB 112H, ARAB 113H must be taken in order. Honors College approval required.

ARAB 112. FIRST-YEAR ARABIC (4). Pronunciation, intonation, grammar, reading, writing, listening comprehension and conversation. Initiation to Arabic culture and attitudes. Designed for students with no prior training in Arabic. Native and/or bilingual speakers of Arabic will not receive credit for ARAB 111, ARAB 112, ARAB 113. **PREREQS:** ARAB 111 or ARAB 111H

ARAB 112H. FIRST-YEAR ARABIC (4). Pronunciation, intonation, grammar, reading, writing, listening comprehension and conversation. Initiation to Arabic culture and attitudes. Designed for students with no prior training in Arabic. Native and/or bilingual speakers of Arabic will not receive credit for ARAB 111H, ARAB 112H, ARAB 113H. **PREREQS:** ARAB 111 or ARAB 111H and Honors College approval required.

ARAB 113. FIRST-YEAR ARABIC (4). Pronunciation, intonation, grammar, reading, writing, listening comprehension and conversation. Initiation to Arabic culture and attitudes. Designed for students with no prior training in Arabic. Native and/or bilingual speakers of Arabic will not receive credit for ARAB 111, ARAB 112, ARAB 113. **PREREQS:** ARAB 112 or ARAB 112H

ARAB 113H. FIRST-YEAR ARABIC (4). Pronunciation, intonation, grammar, reading, writing, listening comprehension and conversation. Initiation to Arabic culture and attitudes. Designed for students with no prior training in Arabic. Native and/or bilingual speakers of Arabic will not receive credit for ARAB 111H, ARAB 112H, ARAB 113H. **PREREQS:** ARAB 112 or ARAB 112H and Honors College approval required.

ARAB 199. SPECIAL TOPICS (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

ARAB 211. SECOND-YEAR ARABIC (4). Further development of listening comprehension, speaking, reading, and writing skills. Completion of ARAB 213 with a grade of C- or better satisfies the BA requirement in foreign languages. **PREREQS:** ARAB 113 and/or instructor approval. Native and/or bilingual speakers of Arabic will not receive credit for ARAB 211.

ARAB 212. SECOND-YEAR ARABIC (4). Further development of listening comprehension, speaking, reading, and writing skills. Completion of ARAB 213 with a grade of C- or better satisfies the BA requirement in foreign languages. **PREREQS:** ARAB 211 and/or instructor approval. Native and/or bilingual speakers of Arabic will not receive credit for ARAB 212.

ARAB 213. SECOND-YEAR ARABIC (4). Further development of listening comprehension, speaking, reading, and writing skills. Completion of ARAB 213 with a grade of C- or better satisfies the BA requirement in foreign languages. **PREREQS:** ARAB 212 and/or instructor approval. Native and/or bilingual speakers of Arabic will not receive credit for ARAB 213.

ARAB 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ARAB 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor permission and school approval are required to register for this course.

ARAB 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

■ AMERICAN SIGN LANGUAGE COURSES

ASL 111. FIRST-YEAR AMERICAN SIGN LANGUAGE (4). A beginning course to learn the basics of American Sign Language. The course focuses on the ASL language and its uses of syntax, grammar, vocabulary, facial expressions and deaf culture.

ASL 112. FIRST-YEAR AMERICAN SIGN LANGUAGE (4). A continuation of ASL 111 with the development of structures, receptive/ expressive skills and vocabulary. Native and/or bilingual speakers of ASL will not receive credit for ASL 111, ASL 112, ASL 113. **PREREQS:** ASL 111 and/or placement test or instructor permission. Students need to have a basic foundation of the language in order to continue with the first-year series.

ASL 113. FIRST-YEAR AMERICAN SIGN LANGUAGE (4). A continuation of ASL 111 and ASL 112 with the further development of structures, receptive/ expressive skills and vocabulary. Native and/or bilingual speakers of ASL will not receive credit for ASL 111, ASL 112, ASL 113. **PREREQS:** ASL 112

ASL 211. SECOND-YEAR AMERICAN SIGN LANGUAGE (4). A continuation of the first-year ASL courses with the further development of structures, receptive/ expressive skills and vocabulary. Native and/or bilingual speakers of ASL will not receive credit for ASL 211, ASL 212, ASL 213. **PREREQS:** ASL 113

ASL 212. SECOND-YEAR AMERICAN SIGN LANGUAGE (4). A continuation of the second-year ASL series with the further development of structures, receptive/ expressive skills and vocabulary. Native and/or bilingual speakers of ASL will not receive credit for ASL 211, ASL 212, ASL 213. **PREREQS:** ASL 211

ASL 213. SECOND-YEAR AMERICAN SIGN LANGUAGE (4). A continuation of the second-year ASL series with the further development of structures, receptive/ expressive skills and vocabulary. Native and/or bilingual speakers of ASL will not receive credit for ASL 211, ASL 212, ASL 213. **PREREQS:** ASL 212

ASN 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

■ CHINESE COURSES

CHN 111. FIRST-YEAR CHINESE (5). Essentials of colloquial Mandarin with emphasis on conversation, reading, and writing. Designed for students with no prior training in Chinese. Native and/or bilingual speakers of Chinese will not receive credit for CHN 111, CHN 112, CHN 113. Lec/Rec. **PREREQS:** CHN 111, CHN 112, CHN 113 must be taken in order.

CHN 112. FIRST-YEAR CHINESE (5). Essentials of colloquial Mandarin with emphasis on conversation, reading, and writing. Designed for students with no prior training in Chinese. Native and/or bilingual speakers of Chinese will not receive credit for CHN 111, CHN 112, CHN 113. Lec/Rec. **PREREQS:** CHN 111 and CHN 111, CHN 112, CHN 113 must be taken in order.

CHN 113. FIRST-YEAR CHINESE (5). Essentials of colloquial Mandarin with emphasis on conversation, reading, and writing. Designed for students with no prior training in Chinese. Native and/or bilingual speakers of Chinese will not

receive credit for CHN 111, CHN 112, CHN 113. Lec/Rec. **PREREQS:** CHN 112 and CHN 111, CHN 112, CHN 113 must be taken in order.

CHN 199. SPECIAL STUDIES (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

CHN 211. SECOND-YEAR CHINESE (4). Further development of listening comprehension, speaking, reading, and writing skills. Emphasis on conversational fluency and increased vocabulary. Native and/or bilingual speakers of Chinese will not receive credit for CHN 211, CHN 212, CHN 213. Completion of CHN 213 with grade of C- or better satisfies BA requirement in foreign languages. Lec/Rec. **PREREQS:** CHN 113 and / or placement. CHN 211, CHN 212, CHN 213 must be taken in order.

CHN 212. SECOND-YEAR CHINESE (5). Further development of listening comprehension, speaking, reading, and writing skills. Emphasis on conversational fluency and increased vocabulary. Native and/or bilingual speakers of Chinese will not receive credit for CHN 211, CHN 212, CHN 213. Completion of CHN 213 with grade of C- or better satisfies BA requirement in foreign languages. Lec/discussion/activity. **PREREQS:** CHN 211

CHN 213. SECOND-YEAR CHINESE (5). Further development of listening comprehension, speaking, reading, and writing skills. Emphasis on conversational fluency and increased vocabulary. Native and/or bilingual speakers of Chinese will not receive credit for CHN 211, CHN 212, CHN 213. Completion of CHN 213 with grade of C- or better satisfies BA requirement in foreign languages. Lec/discussion. **PREREQS:** CHN 212 and /or placement.

CHN 299. SPECIAL STUDIES (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

CHN 311. THIRD-YEAR CHINESE LANGUAGE (3). Further development of listening, speaking, reading, and writing skills to a more advanced level with emphasis on the practical application of the Chinese language. **PREREQS:** CHN 213

CHN 312. THIRD-YEAR CHINESE LANGUAGE (3). Further development of listening, speaking, reading, and writing skills to a more advanced level with emphasis on the practical application of the Chinese language. Lec/rec. **PREREQS:** CHN 311 and .

CHN 313. THIRD-YEAR CHINESE LANGUAGE (3). Continuation of CHN 312. A language-use course for business and travel. Study of the vocabulary and sentence structures used in business communication. Reading of authentic business documents. Viewing of a video series on traveling in China. Integrated practice of listening, speaking, reading and writing. Lec/rec. **PREREQS:** CHN 312 and .

CHN 331. *CHINESE CULTURE (3). Introduction to basic features of Chinese culture from ancient times to the present. The Classical and Medieval Periods--17th century B.C. to 14th century A.D. Topics include history, philosophy, religion, literature and the arts, science and technology, political and economic systems, and everyday life. Taught in English. Open to all students. May not be offered every year. (NC) (Bacc Core Course) **PREREQS:** Sophomore standing. CHN 331, CHN 331, CHN 333 need not be taken in order.

CHN 332. *CHINESE CULTURE (3). Introduction to basic features of Chinese culture from ancient times to the present. The late Imperial Period--15th century to early 20th century. Topics include history, philosophy, religion, literature and the arts, science and technology, political and economic systems, and everyday life. Taught in English. Open to all students. May not be offered every

year. (NC) (Bacc Core Course) **PREREQS:** Sophomore standing. CHN 331, CHN 331, CHN 333 need not be taken in order.

CHN 333. *CHINESE CULTURE (3). Introduction to basic features of Chinese culture from ancient times to the present. Focus on 20th century. Topics include history, philosophy, religion, literature and the arts, science and technology, political and economic systems, and everyday life. Taught in English. Open to all students. May not be offered every year. (NC) (Bacc Core Course) **PREREQS:** Sophomore standing. CHN 331, CHN 331, CHN 333 need not be taken in order.

CHN 379. PROCTOR EXPERIENCE (1-2). Supervised practicum for advanced students, with assignments as proctor or tutor in lower-division Chinese courses. May be repeated for credit. No credit may be used to satisfy requirements for a minor in Chinese. Graded P/N. This course is repeatable for a maximum of 6 credits. **PREREQS:** Completion of third-year Chinese with a minimum 3.0 GPA in that sequence and prior authorization from supervisor.

CHN 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

CHN 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

CHN 403. THESIS (1-16). **PREREQS:** Departmental approval required.

CHN 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

CHN 410. INTERNSHIP (1-15).

CHN 411. FOURTH-YEAR CHINESE (NEWSPAPER CHINESE) (3). Development of reading, writing, and speaking skills at a more advanced level; reading of newspaper articles from China, Taiwan, and other sources; oral reports and compositions in Chinese. Not offered every year. **PREREQS:** CHN 313 or placement and departmental approval required. CHN 411, CHN 412, CHN 413 must be taken in order.

CHN 412. FOURTH-YEAR CHINESE (NEWSPAPER CHINESE) (3). Development of reading, writing, and speaking skills at a more advanced level; reading of newspaper articles from China, Taiwan, and other sources; oral reports and compositions in Chinese. Not offered every year. **PREREQS:** CHN 411 or placement and departmental approval required.

CHN 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

CHN 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

■ ETHNIC STUDIES COURSES

ES 101. *INTRODUCTION TO ETHNIC STUDIES (3). This interdisciplinary course focuses on the ethnic group experience in the United States with emphasis on African Americans, Native Americans, Chicanos/as, Latinos/as, and Asian Americans. (Bacc Core Course)

ES 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ES 201. INVENTING ETHNIC AMERICA (3). Examination of contemporary America, focusing on the way elements of diverse ethnic societies--family, leisure, education, and employment--intersect, determine identity, and shape lifestyles.

ES 212. *SURVEY OF CHICANO/A-LATINO/A STUDIES (3). An interdisciplinary survey of the Chicano/a-Latino/a experience, 1848-present. Topics include conquest and colonization, cultural resistance, social stratification, immigration, grassroots movements, and expressive culture. (Bacc Core Course)

ES 213. *CONTEMPORARY LATINO/A CULTURE AND ISSUES (3). A comparative interdisciplinary treatment of contemporary Latino/a cultures and current issues affecting their status in the United States. (Bacc Core Course)

ES 221. *SURVEY OF AFRICAN AMERICAN STUDIES I (3). An interdisciplinary survey of the African American experience beginning with pre-colonial Africa and ending with World War I. (H) (NC) (Bacc Core Course)

ES 221H. *SURVEY OF AFRICAN AMERICAN STUDIES I (3). An interdisciplinary survey of the African American experience beginning with pre-colonial Africa and ending with World War I. (H) (NC) (Bacc Core Course) **PREREQS:** Honors College approval required.

ES 223. *SURVEY OF AFRICAN AMERICAN STUDIES II (3). Interdisciplinary survey of the African American experience beginning with the economic collapse of 1929, the New Deal, and ending in the 1990s with conservative efforts to end civil rights laws of the 1960s. (Bacc Core Course)

ES 231. *ASIAN AMERICAN STUDIES: MID-1800S-PRESENT (4). Examination of the histories and experiences of Asian Americans from the mid-1800s to the present through historical texts, oral histories, personal essays, video, audio, and creative writings. (H) (Bacc Core Course)

ES 233. *ASIAN AMERICAN STUDIES II: ACTIVISM AND EMPOWERMENT (3). A look at historical and contemporary Asian American activism and issues, from early labor organizing to the Asian American Movement of the 1960s and 70s to contemporary issues and efforts toward community empowerment. (H) (Bacc Core Course)

ES 241. *SURVEY OF NATIVE AMERICANS AND ALASKAN NATIVES (3). Comprehensive examination of Native American and Alaskan Native cultures and history, both prior to and following contact with outsiders. (H) (NC) (Bacc Core Course)

ES 241H. *SURVEY OF NATIVE AMERICANS AND ALASKAN NATIVES (3). Comprehensive examination of Native American and Alaskan Native cultures and history, both prior to and following contact with outsiders. (H) (NC) (Bacc Core Course) **PREREQS:** Honors College approval required.

ES 242. *FEDERAL-INDIAN RELATIONS IN 19TH CENTURY U.S. AND CANADA (3). Comprehensive ethno historical course analyzing native experience with the developing United States and Canadian federal government policies to 1900. (H) (NC) (Bacc Core Course)

ES 243. *NATIVE AMERICAN EXPERIENCE IN THE 20TH CENTURY U.S. (3). Comprehensive course dealing with Native American, Alaskan Native, and Native Hawaiian experience under the 20th century United States government. (H) (NC) (Bacc Core Course)

ES 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ES 311. NARRATIVES OF LATINO MIGRATIONS (3). A study of the scholarship and creative literature dealing with migrations from Mexico and other Latin American countries to the United States.

ES 314. CHICANO/A LITERATURE (3). A survey of select works in various genres. Attention to questions of cultural production, reception, critical approaches and how factors such as race, gender, and class impact Chicano/a discursive practices.

ES 321. AFRICAN AMERICAN POLITICAL & SOCIAL THOUGHT IN 20TH CENTURY (3). This interdisciplinary course examines the dialogues, conflicts and self-representations produced by African Americans beginning with the closing years of the 19th century (1895) and ending with the opening days of World War II.

ES 323. CONTEMPORARY AFRICAN AMERICAN SOCIAL DISCOURSE (3).

Interdisciplinary course examines key African American political discourse(s) that emerged in response to major social and cultural transformations occurring in the United States after World War II to the present.

ES 332. ASIAN PACIFIC AMERICANS AND THE MEDIA (3). A broad study of representations of Asians/Pacific Islanders and Asian Pacific Americans in various United States media and their effects.

ES 334. *ASIAN AMERICAN LITERATURE (3). An examination of various work by Asian Americans with particular attention to critical frameworks and issues of identity and representation. (Bacc Core Course)

ES 345. NATIVE AMERICANS IN OREGON (4). Analysis and understanding of the complex experiences of Native Americans in the present state of Oregon, from early contact with those of other ethnicities to contemporary demographic contexts. (H) (NC)

ES 351. *ETHNIC MINORITIES IN OREGON (3). Exploration of the cultures and contributions of major ethnic groups in the state of Oregon. With timelines, oral histories, and audiovisual aids, the course will allow students to learn the ethnic and regional diversity in Oregon history. (Bacc Core Course)

ES 352. *ASIAN REPRESENTATION IN HOLLYWOOD AND INDEPENDENT CINEMAS (3). This four-week summer seminar held annually at Central University for Nationalities (CUN) in Beijing introduces students to ethnic representation in American film culture. The course is organized around the themes of image, identities, and representation, and focuses on Asian representation in Hollywood movies and independent films made by Asian Americans. (Bacc Core Course)

ES 353. ENVIRONMENTAL RACISM (4). *Introduces environmental racism; the unequal impact of environmental harm on communities of color and indigenous peoples. Presents empirical evidence and theoretical frames, and explores efforts by government, residents, and activists to combat it. Considers questions of environmental justice via social structure, public access, open space, indigeneity, food, and media. (Bacc Core Course)

ES 354. ^LITERATURE OF ETHNIC MINORITIES IN THE UNITED STATES (3). Literary works by ethnic minorities addressing issues of race and ethnicity in U.S. culture and society. (Writing Intensive Course) **PREREQS:** ES 101 or ES 201

ES 355. *RACE, SPACE, AND DIFFERENCE (4). A hands-on approach to exploring how we make space, and why geography is always infused with markers of social identity and exercises of power. We will practice "reading" space and landscapes, and learn how notions of race and other forms of "difference" shape space (and vice versa) to produce experiences of inclusion, exclusion, cooperation, and conflict. (Bacc Core Course)

ES 373. APPROACHES TO SOCIAL JUSTICE (3). Students study various ways of thinking about social justice and evaluate these in case studies and current events. As a basis for the Social Justice minor, students write a research paper on the theoretical and practical aspects of a social justice issue. **CROSSLISTED** as ANTH 373, WGSS 373, WLC 373.

ES 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ES 399H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

ES 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ES 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ES 403. THESIS (1-16). **PREREQS:** Departmental approval required.

ES 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ES 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ES 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ES 408. WORKSHOP (1-16). This course is repeatable for a maximum of 99 credits.

ES 409. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ES 410. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ES 411. CHICANO/AS IN/ON FILM (3). Exploration of how Mexicans and Mexican Americans have been portrayed in Hollywood film and how contemporary filmmakers from this group are challenging traditional representations.

ES 431. *QUEER OF COLOR CRITIQUES (3). "Queer of color critiques" refers to political theories and activism that emerge from LGBTQ people of color to examine the intersections between race, sexuality and gender. This course addresses these intersections through theory, history, and activism. (Bacc Core Course) **CROSSLISTED** as QS 431 and WGSS 431. **PREREQS:** Junior standing.

ES 437. GENDER ISSUES IN ASIAN AMERICAN STUDIES (3). An examination of various ways gender issues have affected Asian American Studies and the ways race and gender are conceptualized as categories of oppression within the field.

ES 444. NATIVE AMERICAN LAW: TRIBES, TREATIES, AND THE UNITED STATES (4). Examination of the parameters of native treaty relationships with the federal and state governments, and considers the future of these agreements.

ES 445. *NATIVE AMERICAN SCIENCE AND TECHNOLOGY (3). Examination of scientific and technological discovery, continuity, and change among indigenous peoples, with particular emphasis on selected communities of pre- and post-European contact North America. (H) (NC) (Bacc Core Course)

ES 448. NATIVE AMERICAN PHILOSOPHIES (3). Native American perspectives on ways of knowing, sources of meaning and ethics, the nature of reality, self, community, and cosmos. Includes lectures, scholarship, story-telling, poetry, theater, and music as forums for this exploration. Introduces ideas of leading Native American thinkers about the human relation to the natural world, sources of strength and wisdom, the nature of time and place and spirit, right ways of acting in communities, both civic and biotic, and the place of beauty in a well-lived life. **CROSSLISTED** as PHL 448/PHL 548.

ES 451. THEORIES OF RACE AND ETHNICITY (3). A seminar examining various theories of race and ethnicity, their historical contexts, and applications.

ES 452. *ETHNICITY IN FILM (3). Using ethnicity and gender as primary frames of reference, this upper-division/graduate level seminar seeks to introduce students to critical film theory and examine ethnicity and gender as a force both in front of and behind the camera. (Bacc Core Course)

ES 453. ETHNOHISTORY METHODOLOGY (3). A seminar developing techniques for collecting, analyzing, and incorporating ethnic community histories in research papers and theses. (Bacc Core Course)

ES 455. INTERNSHIP SEMINAR (1). Prepares students for the internship and provides an opportunity to explore career options and/or graduate study. **PREREQS:** ES 101 and ES 201

ES 457. LITERATURE BY WOMEN OF COLOR IN THE UNITED STATES (3). A comparative examination of works by various women writers of color and their treatment of such issues as race, ethnicity, class, sexuality, and gender.

ES 458. RACIAL PATTERNS OF URBANIZATION (3). This interdisciplinary course will examine the linkages between race and patterns of urbanization. It will examine how ideologies about race and gender have set the themes of debate and discussion about urbanization in both theoretical and popular discourses. **PREREQS:** ES 101 and ES 201

ES 460. ETHNICITY AND SOCIAL JUSTICE (3). Seminar addresses serious inequities and social justice issues in contemporary American society. With a textbook specifically on pedagogy, the class will examine the role of race and ethnicity in our public policy and social justice, specifically focusing on housing, poverty, employment, public health, education, law enforcement and the environment.

ES 461. RACISM AND THE PRISON INDUSTRIAL COMPLEX (4). The prison industrial/punishment complex in the late 20th and early 21st centuries has become a growth industry with the privatization of prisons, and mass incarceration of mostly people-of-color. This course examines the history and growth of this industry and the implications that it has on this democracy.

ES 472. ^INDIGENOUS TWO-SPIRIT AND QUEER STUDIES (3). "Two-spirit" refers to North American indigenous genders outside of European male/female binaries. Two-spirit communities argue for decolonization as a central political struggle, calling all people to unlearn settler colonial gender/sexuality on Native land. This course addresses indigenous two-spirit/GLBTQ issues through theory, literature, activism, and art. **CROSSLISTED** as QS 472, WGSS 472. **PREREQS:** QS 262 or ES 242 or WGSS 414 or instructor permission

ES 477. *QUEER/TRANS PEOPLE OF COLOR ARTS AND ACTIVISM (3). LGBTQ people of color often engage struggles for social justice through artistic movements. This course will focus on arts by LGBTQ people of color and the way these artistic movements contribute to activism that interrupts interlocking systems of oppression. (Bacc Core Course) **CROSSLISTED** as QS 477/ QS 577, WGSS 477/WGSS 577. **PREREQS:** QS 262 and QS 462

ES 485. CAPSTONE IN SOCIAL JUSTICE (2). Working with an advisor from the Social Justice minor, students conduct research to synthesize and extend analysis of a particular social justice issue, building on three previous papers or projects. Results are presented in a 10-15 page paper and a public poster, presentation or website. **CROSSLISTED** as ANTH 485, WGSS 485, WLC 485. This course is repeatable for a maximum of 4 credits. **PREREQS:** (ANTH 373 or ES 373 or WGSS 373 or WLC 373) and (ANTH 410 or ES 410 or WGSS 410 or WLC 410)

ES 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ES 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ES 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ES 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

ES 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ES 506. SPECIAL PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ES 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ES 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

ES 509. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ES 510. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ES 531. QUEER OF COLOR CRITIQUES (3). "Queer of color critiques" refers to political theories and activism that emerge from LGBTQ people of color to examine the intersections between race, sexuality and gender. This course addresses these intersections through theory, history, and activism. **CROSSLISTED** as QS 531 and WGSS 531. **PREREQS:** Junior standing.

ES 537. GENDER ISSUES IN ASIAN AMERICAN STUDIES (3). An examination of various ways gender issues have affected Asian American Studies and the ways race and gender are conceptualized as categories of oppression within the field.

ES 544. NATIVE AMERICAN LAW: TRIBES, TREATIES, AND THE U.S. (4). Examination of the parameters of native treaty relationships with the federal and state governments, and considers the future of these agreements.

ES 548. NATIVE AMERICAN PHILOSOPHIES (3). Native American perspectives on ways of knowing, sources of meaning and ethics, the nature of reality, self, community, and cosmos. Includes lectures, scholarship, story-telling, poetry, theater, and music as forums for this exploration. Introduces ideas of leading Native American thinkers about the human relation to the natural world, sources of strength and wisdom, the nature of time and place and spirit, right ways of acting in communities, both civic and biotic, and the place of beauty in a well-lived life. **CROSSLISTED** as PHL 448/PHL 548.

ES 551. THEORIES OF RACE AND ETHNICITY (3). A seminar examining various theories of race and ethnicity, their historical contexts, and applications.

ES 552. ETHNICITY IN FILM (3). Using ethnicity and gender as primary frames of reference, this upper-division/graduate level seminar seeks to introduce students to critical film theory and examine ethnicity and gender as a force both in front of and behind the camera.

ES 553. ETHNOHISTORY METHODOLOGY (3). A seminar developing techniques for collecting, analyzing, and incorporating ethnic community histories in research papers and theses.

ES 557. LITERATURE BY WOMEN OF COLOR IN THE UNITED STATES (3). A comparative examination of works by various women writers of color and their treatment of such issues as race, ethnicity, class, sexuality, and gender.

ES 558. RACIAL PATTERNS OF URBANIZATION (3). This interdisciplinary course will examine the linkages between race and patterns of urbanization. It will examine how ideologies about race and gender have set the themes of debate and discussion and about urbanization in both theoretical and popular discourses. **PREREQS:** ES 101 and ES 201

ES 560. ETHNICITY AND SOCIAL JUSTICE (3). Seminar addresses serious inequities and social justice issues in contemporary American society. With a textbook specifically on pedagogy, the class will examine the role of race and ethnicity in our public policy and social justice, specifically focusing on housing, poverty, employment, public health, education, law enforcement and the environment.

ES 561. RACISM AND THE PRISON INDUSTRIAL COMPLEX (4). The prison industrial/punishment complex in the late 20th and early 21st centuries has become a growth industry with the privatization of prisons, and mass incarceration of mostly people-of-color. This course examines the history and growth of this industry and the implications that it has on this democracy.

ES 572. INDIGENOUS TWO-SPIRIT AND QUEER STUDIES (3). "Two-spirit" refers to North American indigenous genders outside of European male/female binaries. Two-spirit communities argue for decolonization as a central political struggle, calling all people to unlearn settler colonial gender/sexuality on Native land. This course addresses indigenous two-spirit/GLBTQ issues through theory, literature, activism, and art. **CROSSLISTED** as QS 572, WGSS 572. **PREREQS:** QS 262 or ES 242 or WGSS 414 or WGSS 514 or instructor permission

ES 577. QUEER/TRANS PEOPLE OF COLOR ARTS AND ACTIVISM (3). LGBTQ people of color often engage struggles for social justice through artistic movements. This course will focus on arts by LGBTQ people of color and the way these artistic movements contribute to activism that interrupts interlocking systems of oppression. **CROSSLISTED** as QS 477/QS 577, WGSS 477/ WGSS 577. **PREREQS:** QS 262 and QS 464

ES 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ES 808. WORKSHOP (1-16). This course is repeatable for a maximum of 99 credits.

■ FRENCH COURSES

FR 111. FIRST-YEAR FRENCH (4). Pronunciation, grammar, reading, writing, listening comprehension, speaking, conversation. Designed specifically for students with no prior training in French. Native and/or bilingual speakers of French will not receive credit for FR 111, FR 112, FR 113. **Lec/rec. PREREQS:** Simultaneous enrollment in FR 199 strongly recommended. FR 111, FR 112, FR 113 must be taken in order.

FR 112. FIRST-YEAR FRENCH (4). Pronunciation, grammar, reading, writing, listening comprehension, speaking, conversation. Designed specifically for students with no prior training in French. Native and/or bilingual speakers of French will not receive credit for FR 111, FR 112, FR 113. **Lec/rec. PREREQS:** FR 111 or Placement Test and simultaneous enrollment in FR 199 strongly recommended.

FR 113. FIRST-YEAR FRENCH (4). Pronunciation, grammar, reading, writing, listening comprehension, speaking, conversation. Designed specifically for students with no prior training in French. Native and/or bilingual speakers of French will not receive credit for FR 111, FR 112, FR 113. **Lec/rec. PREREQS:** FR 112 or Placement Test and simultaneous enrollment in FR 199 strongly recommended.

FR 121. SURVIVAL FRENCH FOR STUDENTS AND TRAVELERS (3). Provides practical linguistic tools for short stays in France. Basic conversation skills, pronunciation, introduction to French non-verbal language, as well as cultural tools, introduction to French etiquette, visual dictionary, and tips for avoiding cross-cultural misunderstandings common between Americans and the French.

FR 188. FRENCH STUDIES, FRENCH STUDY CENTERS (1-12). May be repeated for credit when topic varies. Section 1: Topics, French language. Section 2: Practical work (exercises). Section 3: Topics, French arts and letters. Section 4: Topics, France and French society. This course is repeatable for a maximum of 12 credits.

FR 199. SPECIAL STUDIES (1-16). Conversation, pronunciation, vocabulary-building, etc. Supplements basic sequence FR 111, FR 112, FR 113. May be repeated for credit when topic varies. This course is repeatable for a maximum of 16 credits.

FR 211. SECOND-YEAR FRENCH (4). Continued development of basic language skills, pronunciation, and vocabulary acquisition; introduction to extensive reading. Native and/or bilingual speakers of French will not receive credit for FR 211, FR 212, FR 213. **Lec/rec. PREREQS:** FR 113 or Placement Test and simultaneous enrollment in FR 299 strongly recommended. FR 211, FR 212, FR 213 must be taken in order.

FR 212. SECOND-YEAR FRENCH (4). Continued development of basic language skills, pronunciation, and vocabulary acquisition; introduction to extensive reading. Native and/or bilingual speakers of French will not receive credit for FR 211, FR 212, FR 213. **Lec/rec. PREREQS:** FR 211 or Placement Test and simultaneous enrollment in FR 299 strongly recommended.

FR 213. SECOND-YEAR FRENCH (4). Continued development of basic language skills, pronunciation, and vocabulary acquisition; introduction to extensive reading. Completion of FR 213 with a grade of C- or better satisfies BA requirement in foreign languages. Native and/or bilingual speakers of French will not receive credit for FR 211, FR 212, FR 213. **Lec/rec. PREREQS:** FR 212 or Placement Test and simultaneous enrollment in FR 299 strongly recommended.

FR 270. *FRANCE TODAY: CULTURES WITHIN AND BEYOND ITS BORDERS (3). An exploratory study of French culture and society since 1945. Topics include: decolonization, immigration, Francophone intellectual currents, France's European vocation, and social conflict today. Conducted in English. (Bacc Core Course)

FR 270H. *FRANCE TODAY: CULTURES WITHIN AND BEYOND ITS BORDERS (3). An exploratory study of French culture and society since 1945. Topics include: decolonization, immigration, Francophone intellectual currents, France's European vocation, and social conflict today. Conducted in English. (Bacc Core Course) **PREREQS:** Honors College approval required.

FR 288. FRENCH STUDIES, FRENCH STUDY CENTERS (1-12). May be repeated for credit when topic varies. Section 1: Topics, French language. Section 2: Practical work (exercises). Section 3: Topics, French arts and letters. Section 4: Topics, France and French society. This course is repeatable for a maximum of 12 credits.

FR 299. SPECIAL STUDIES (1-16). Conversation, pronunciation, vocabulary-building, etc. Supplements basic sequence FR 211, FR 212, FR 213. May not be offered every year. May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. This course is repeatable for a maximum of 16 credits.

FR 311. THIRD-YEAR FRENCH (3). A language-use course; primary emphasis on developing oral and written proficiency; extensive practice in speaking and writing. Grammar review; vocabulary study; written assignments including original compositions. Conducted in French. **PREREQS:** FR 213 and departmental approval. FR 311, FR 312, FR 313 must be taken in order.

FR 312. THIRD-YEAR FRENCH (3). A language-use course; primary emphasis on developing oral and written proficiency; extensive practice in speaking and writing. Grammar review; vocabulary study; written assignments including original

compositions. Conducted in French. **PREREQS:** FR 311 and departmental approval.

FR 313. THIRD-YEAR FRENCH (3). A language-use course; primary emphasis on developing oral and written proficiency; extensive practice in speaking and writing. Grammar review; vocabulary study; written assignments including original compositions. Conducted in French. **PREREQS:** FR 312 and departmental approval.

FR 315. FRENCH FOR BUSINESS (3). An introduction to the French business world and business language. Development of business vocabulary; discussion; practice in writing resumes, business letters and business reports. Conducted in French. May not be offered every year. **PREREQS:** FR 213 or placement.

FR 319. SELECTED TOPICS IN FRENCH LANGUAGE (3). Skill-orientation variable. Conducted in French. May be repeated for credit when topic varies. See Schedule of Classes for current topics and prerequisites. Not offered every year. This course is repeatable for a maximum of 9 credits.

FR 329. *FRANCOPHONE CULTURES IN FILM (3-9). An exploration of the different cultures of France and the Francophone world through film. Students will delve into the heart of these societies and discover their socio-historical, political, economic and cultural context. Students' analytical and critical skills will be thoroughly solicited through various research and writing activities. Taught in English. (Bacc Core Course) This course is repeatable for a maximum of 9 credits.

FR 329H. *FRANCOPHONE CULTURES IN FILM (3-9). An exploration of the different cultures of France and the Francophone world through film. Students will delve into the heart of these societies and discover their socio-historical, political, economic and cultural context. Students' analytical and critical skills will be thoroughly solicited through various research and writing activities. Taught in English. (Bacc Core Course) This course is repeatable for a maximum of 9 credits. **PREREQS:** Honors College approval required.

FR 331. *FRENCH CULTURE AND SOCIETY SINCE THE REVOLUTION (3). Cultural life of the French people from 1789 to the present. Conducted in French. Need not be taken in order. (H) (Bacc Core Course) **PREREQS:** Completion of 3 credits of 300-level French or placement for FR 331 and FR 332.

FR 332. *FRENCH CULTURE AND SOCIETY SINCE THE REVOLUTION (3). Cultural life of the French people from 1789 to the present. Conducted in French. Need not be taken in order. (H) (Bacc Core Course) **PREREQS:** Completion of 3 credits of 300-level French or placement for FR 331 and FR 332.

FR 333. *FRENCH CULTURE AND SOCIETY SINCE THE REVOLUTION (3). Cultural life of the French people from 1789 to the present. Conducted in French. Need not be taken in order. (H) (Bacc Core Course) **PREREQS:** Completion of 6 credits of 300-level French or placement for FR 333.

FR 334. GENDER AND SEXUAL IDENTITIES IN THE FRANCOPHONE WORLD (3). Students will engage with a wide variety of materials (literary texts, newspaper articles, films, documentaries, etc.) in order to explore the construction of gender roles and sexual identities in France and the French-speaking world, as well as examine contemporary issues related to gender and sexuality in the French-speaking world at large. Taught in French. **PREREQS:** FR 312

FR 339. FRENCH: FRANCOPHONE STUDIES (3). May be repeated for credit when topic varies. Not offered every year. This course is repeatable for a maximum of 9 credits.

FR 340. INTRODUCTION TO FRENCH LITERARY STUDIES (3). Concepts and vocabulary fundamental to the study of French literature; general view of the main currents of French literary history; introduction to French versification; techniques of literary analysis; practice in literary analysis and in writing about literature; explication de texte. Conducted in French. (H) **PREREQS:** FR 213 or placement.

FR 349. SELECTED TOPICS IN FRANCOPHONE LITERATURE (3). Literary works, themes, movements, or authors from French-speaking areas of the world. Conducted in French. May be repeated for credit when topic varies. See Schedule of Classes for current topics and prerequisites. Not offered every year. This course is repeatable for a maximum of 9 credits.

FR 379. PROCTOR EXPERIENCE (1-2). Supervised practicum for advanced students. Assignments as proctors or tutors in lower-division French courses. No more than 2 credits may be used to satisfy degree requirements for a major in French; may not be used to satisfy requirements for a minor in French. Graded P/N. This course is repeatable for a maximum of 6 credits. **PREREQS:** Completion of 12 upper-division credits in French, including FR 311, FR 312, FR 313 and FR 351, with a minimum 3.0 GPA and prior authorization from supervisor.

FR 388. FRENCH STUDIES, FRENCH STUDY CENTERS (1-12). May be repeated when topic varies. Section 1: Topics, French language. Section 2: Practical work (exercises). Section 3: Topics, French arts and letters. Section 4: Topics, France and French society. This course is repeatable for a maximum of 12 credits.

FR 399. SPECIAL TOPICS (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

FR 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

FR 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

FR 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

FR 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

FR 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

FR 410. INTERNSHIP (1-15).

FR 411. FOURTH-YEAR FRENCH (3). A language-use course; primary emphasis on developing oral and written proficiency; extensive practice in speaking and writing. Grammar review; vocabulary study; analysis of writing styles and techniques; oral reports and original presentations in French; original compositions. Conducted in French. **PREREQS:** FR 313 and departmental approval.

FR 412. FOURTH-YEAR FRENCH (3). A language-use course; primary emphasis on developing oral and written proficiency; extensive practice in speaking and writing. Grammar review; vocabulary study; analysis of writing styles and techniques; oral reports and original presentations in French; original compositions. Conducted in French. **PREREQS:** FR 313 and departmental approval.

FR 413. FOURTH-YEAR FRENCH (3). A language-use course; primary emphasis on developing oral and written proficiency; extensive practice in speaking and writing. Grammar review; vocabulary study; analysis of writing styles and

techniques; oral reports and original presentations in French; original compositions. Conducted in French. **PREREQS:** FR 313 and departmental approval.

FR 439. ^FRENCH: FRANCOPHONE STUDIES (3). Variable topics in language, culture, or literature. May be repeated for credit when topic varies. Conducted in French. See Schedule of Classes for current topics and prerequisites. Not offered every year. (Writing Intensive Course) This course is repeatable for a maximum of 9 credits.

FR 449. SELECTED TOPICS IN FRANCOPHONE LITERATURE (3). Conducted in French. May be repeated for credit when topic varies. See Schedule of Classes for current topics and prerequisites. Not offered every year. This course is repeatable for a maximum of 9 credits.

FR 488. FRENCH STUDIES, FRENCH STUDY CENTERS (1-12). May be repeated for credit when topics varies. Section 1: Topics, French language. Section 2: Practical work (exercises). Section 3: Topics, French arts and letters. Section 4: Topics, France and French Society. This course is repeatable for a maximum of 12 credits.

FR 499. SPECIAL TOPICS (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 9 credits.

FR 499H. SPECIAL TOPICS (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 9 credits. **PREREQS:** Honors College approval required.

FR 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

FR 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

FR 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

FR 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

FR 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

FR 511. FOURTH-YEAR FRENCH (3). A language-use course; primary emphasis on developing oral and written proficiency; extensive practice in speaking and writing. Grammar review; vocabulary study; analysis of writing styles and techniques; oral reports and original presentations in French; original compositions. Conducted in French. **PREREQS:** FR 313 and departmental approval.

FR 512. FOURTH-YEAR FRENCH (3). A language-use course; primary emphasis on developing oral and written proficiency; extensive practice in speaking and writing. Grammar review; vocabulary study; analysis of writing styles and techniques; oral reports and original presentations in French; original compositions. Conducted in French. **PREREQS:** FR 511 and departmental approval.

FR 513. FOURTH-YEAR FRENCH (3). A language-use course; primary emphasis on developing oral and written proficiency; extensive practice in speaking and writing. Grammar review; vocabulary study; analysis of writing styles and techniques; oral reports and original presentations in French; original compositions. Conducted in French. **PREREQS:** FR 512 and departmental approval.

FR 539. FRENCH: FRANCOPHONE STUDIES (3). Variable topics in language, culture, or literature. May be repeated for credit when topic varies. Conducted in French. See Schedule of

Classes for current topics and prerequisites. Not offered every year. This course is repeatable for a maximum of 12 credits.

FR 549. SELECTED TOPICS IN FRANCOPHONE LITERATURE (3). Conducted in French. May be repeated for credit when topic varies. See Schedule of Classes for current topics and prerequisites. Not offered every year. This course is repeatable for a maximum of 9 credits.

FR 588. FRENCH STUDIES, FRENCH STUDY CENTERS (1-12). May be repeated for credit when topic varies. Section 1: Topics, French language. Section 2: Practical work (exercises). Section 3: Topics, French arts and letters. Section 4: Topics, France and French society. This course is repeatable for a maximum of 12 credits.

■ GERMAN COURSES

GER 111. FIRST-YEAR GERMAN (4). Development of basic writing, reading, listening, and speaking skills; includes cultural component. Designed solely for students with no prior training in German. Native or bilingual speakers of German will not receive credit for GER 111, GER 112, or GER 113. Lec/lab/rec. **PREREQS:** GER 111, GER 112, GER 113 must be taken in order.

GER 112. FIRST-YEAR GERMAN (4). Development of basic writing, reading, listening, and speaking skills; includes cultural component. Designed solely for students with no prior training in German. Native or bilingual speakers of German will not receive credit for GER 111, GER 112, or GER 113. Lec/lab/rec. **PREREQS:** GER 111 or placement test score.

GER 113. FIRST-YEAR GERMAN (4). Development of basic writing, reading, listening, and speaking skills; includes cultural component. Designed solely for students with no prior training in German. Native or bilingual speakers of German will not receive credit for GER 111, GER 112, or GER 113. Lec/lab/rec. **PREREQS:** GER 112 or placement test score.

GER 121. GERMAN CONVERSATION FOR BEGINNERS I (1). Optional course that can be taken along with GER 111 or for general practice. Designed for students who would like to continue developing basic learning and speaking skills in German through independent work with a variety of media. Graded P/N.

GER 122. GERMAN CONVERSATION FOR BEGINNERS II (1). Optional course that can be taken along with GER 112 or for general practice. Designed for students who would like to continue developing basic learning and speaking skills in German through independent work with a variety of media. Graded P/N.

GER 123. GERMAN CONVERSATION FOR BEGINNERS III (1). Optional course that can be taken along with GER 111 or for general practice. Designed for students who would like to continue developing basic learning and speaking skills in German through independent work with a variety of media. Graded P/N.

GER 188. GERMAN STUDIES, GERMAN STUDY CENTER (1-12). May be repeated for credit when topic varies. Section 1: Topics, German language. Section 2: Practical work (exercises). This course is repeatable for a maximum of 12 credits.

GER 199. SPECIAL STUDIES (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

GER 211. SECOND-YEAR GERMAN (4). Continuing development of writing, reading, listening, and speaking skills; cultural component. Completion of second-year German or equivalent with a GPA of 2.50 or higher serves as a prerequisite for upper-division courses. Native or bilingual speakers of German will not receive credit for GER 211, GER 212 or GER 213. Lec/

lab/rec. **PREREQS:** GER 113 or placement test score.

GER 212. SECOND-YEAR GERMAN (4). Continuing development of writing, reading, listening, and speaking skills; cultural component. Completion of Second-Year German or equivalent with a GPA of 2.50 or higher serves as a prerequisite for upper-division courses. Native or bilingual speakers of German will not receive credit for GER 211, GER 212, or GER 213. Lec/rec. **PREREQS:** GER 211 or placement test score.

GER 213. SECOND-YEAR GERMAN (4). Continuing development of writing, reading, listening, and speaking skills; cultural component. Completion of Second-Year German or equivalent with a GPA of 2.50 or higher serves as a prerequisite for upper-division courses. Completion of GER 213 with grade of C- or better satisfies BA requirement in foreign languages. Native or bilingual speakers of German will not receive credit for GER 211, GER 212, or GER 213. Lec/rec. **PREREQS:** GER 212 or placement test score.

GER 221. GERMAN CONVERSATION FOR INTERMEDIATE SPEAKERS I (1). Optional course that can be taken along with GER 211 or for general practice. Designed for students who would like to continue developing basic learning and speaking skills in German through independent work with a variety of media. Graded P/N.

GER 222. GERMAN CONVERSATION FOR INTERMEDIATE SPEAKERS II (1). Optional course that can be taken along with GER 212 or for general practice. Designed for students who would like to continue developing basic learning and speaking skills in German through independent work with a variety of media. Graded P/N.

GER 223. GERMAN CONVERSATION FOR INTERMEDIATE SPEAKERS III (1). Optional course that can be taken along with GER 213 or for general practice. Designed for students who would like to continue developing basic learning and speaking skills in German through independent work with a variety of media. Graded P/N.

GER 231. *GERMAN DICTATORSHIPS: NAZIS AND COMMUNISTS (3). Introduction to the two best-known dictatorships in German society, National Socialism of the Third Reich from 1933-1945 and Socialism in the German Democratic Republic from 1949-1989 via the study of visual media (feature films, documentaries, newsreels, etc.) and other primary and secondary sources. (Bacc Core Course) **PREREQS:** Sophomore standing.

GER 261. *MASTERPIECES OF GERMAN CINEMA (3). An introduction to the serious study of German cinema, 1920 to present. Class lectures discussing key works of German cinema will offer a variety of historical, critical and theoretical approaches. Weekly screenings of important films accompany the lectures. Taught in English. Film fee will be required. (Bacc Core Course)

GER 261H. *MASTERPIECES OF GERMAN CINEMA (3). An introduction to the serious study of German cinema, 1920 to present. Class lectures discussing key works of German cinema will offer a variety of historical, critical and theoretical approaches. Weekly screenings of important films accompany the lectures. Taught in English. Film fee will be required. (Bacc Core Course) **PREREQS:** Honors College approval required.

GER 288. GERMAN STUDIES, GERMAN STUDY CENTER (1-12). May be repeated for credit when topic varies. Section 1: Topics, German language. Section 2: Practical work (exercises). Section 3: Topics, German arts and letters. Section 4: Topics, Germany and German society. This course is repeatable for a maximum of 12 credits.

GER 299. SPECIAL STUDIES (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

GER 311. THIRD-YEAR GERMAN (3). Focus on development of German writing, speaking, and listening skills. Conducted in German. Required of German majors and minors. **PREREQS:** GER 213 or equivalent.

GER 312. THIRD-YEAR GERMAN (3). Focus on development of German writing, speaking, and listening skills. Conducted in German. Required of German majors and minors. **PREREQS:** GER 213 or equivalent.

GER 313. THIRD-YEAR GERMAN (3). Focus on development of German writing, speaking, and listening skills. Conducted in German. Both courses required of German majors and minors. **PREREQS:** GER 213 or equivalent.

GER 319. SELECTED TOPICS IN GERMAN LANGUAGE (3). Focus on development of German language skills and/or history of the language. Conducted in German. May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Lec/rec. Not offered every year. This course is repeatable for a maximum of 9 credits.

GER 321. GERMAN CONVERSATION FOR ADVANCED SPEAKERS I (1). Designed for students who would like to continue developing basic listening and speaking skills in German through independent work with a variety of media. Graded P/N. **PREREQS:** GER 213

GER 322. GERMAN CONVERSATION FOR ADVANCED SPEAKERS II (1). Designed for students who would like to continue developing basic listening and speaking skills in German through independent work with a variety of media. **PREREQS:** GER 213

GER 323. GERMAN CONVERSATION FOR ADVANCED SPEAKERS III (1). Designed for students who would like to continue developing basic listening and speaking skills in German through independent work with a variety of media. Graded P/N. **PREREQS:** GER 213

GER 329. SELECTED TOPICS IN LITERATURE AND/OR CULTURE (3). May be repeated for credit when topic varies. See Schedule of Classes for current offerings. Not offered every year. This course is repeatable for a maximum of 9 credits. **PREREQS:** Sophomore standing.

GER 331. *GERMAN CULTURE (3). Aspects of history, politics, art, music, literature, and everyday life in German-speaking countries. Attention to development of German language skills. Conducted in German. (H) (Bacc Core Course) **PREREQS:** GER 213

GER 332. *GERMAN CULTURE (3). Aspects of history, politics, art, music, literature, and everyday life in German-speaking countries. Attention to development of German language skills. Conducted in German. (H) (Bacc Core Course) **PREREQS:** GER 213

GER 339. SELECTED TOPICS IN GERMAN CULTURE (3). Focus on specific aspects of German culture. Attention to development of German language skills. Conducted in German. May be repeated for credit when topic varies. See Schedule of Classes for current offerings. Not offered every year. This course is repeatable for a maximum of 9 credits. **PREREQS:** Completion of 9 credits from GER 311, GER 312, GER 313.

GER 341. SURVEY OF GERMAN LITERATURE (3). Major works and literary theories of German literature in their cultural context. Attention to development of German language skills with special emphasis on reading and discussion. Conducted in German. (H) **PREREQS:** GER 213 or placement.

GER 342. SURVEY OF GERMAN LITERATURE (3). Major works and literary theories of German literature in their cultural context. Attention to development of German language skills with special emphasis on reading and discussion. Conducted in German. (H) **PREREQS:** GER 213 or placement.

GER 343. SURVEY OF GERMAN LITERATURE (3). Major works and literary theories of German literature in their cultural context. Attention to development of German language skills with special emphasis on reading and discussion. Conducted in German. (H) **PREREQS:** GER 213 or placement.

GER 349. SELECTED TOPICS IN GERMAN LITERATURE (3). Attention to development of German language skills. Conducted in German. May be repeated for credit when topic varies. See Schedule of Classes for current offerings. Not offered every year. This course is repeatable for a maximum of 9 credits. **PREREQS:** GER 213 or placement.

GER 351. GERMAN PRONUNCIATION AND PHONETICS (3). Analysis of the fundamentals of the German sound system, including pronunciation, phonology, phonetic and contrastive analysis of sounds; phonemes, intonation, and tone patterns. Required of students working toward a teaching certificate in German. Not offered every year. **PREREQS:** GER 213 or placement.

GER 355. TRANSLATION (3). Introduces students to translation studies in theory and practice. Students will learn problems behind translating texts and strategies to overcome these issues, before working on shorter and longer translation projects of a variety of texts. Taught in English. **PREREQS:** GER 312

GER 361. CRITICAL ISSUES OF GERMAN CINEMA (3). Critique of current scholarly debates in German cinema (popular cinema, stars, institutional and cultural frameworks, cultural politics, and transnational connections) in connection with the critical viewing of a large variety of films from various periods. Taught in English.

GER 362. DIVIDED SCREEN: GERMAN CINEMA BETWEEN 1945 AND 1990 (3). Introduces German cinema between the corner dates 1945--division into East and West--and German unification in 1990. Compares and contrasts films made in East and West Germany to understand differences and similarities in the political and cultural set-up of the two states.

GER 363. CONTEMPORARY GERMAN CINEMA (3). Introduces German cinema after unification in 1990. Analyzes German films from various genres, "schools," and directors. Reflects and compares contemporary issues of Germany, Austria, and Switzerland to Hollywood cinema.

GER 379. PROCTOR EXPERIENCE (1-2). Supervised practicum for advanced students, with assignments as proctors or tutors in lower-division German language courses. No more than 2 credits may be used to satisfy degree requirements for a major in German; no credit may be used to satisfy requirements for a minor in German. Graded P/N. This course is repeatable for a maximum of 6 credits. **PREREQS:** Completion of 12 upper-division credits in German, including GER 311, GER 312, GER 313 and prior authorization of supervisor.

GER 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

GER 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GER 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GER 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GER 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GER 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GER 410. INTERNSHIP (1-15).

GER 411. ^FOURTH-YEAR GERMAN (3). Focus on development of German writing, speaking, and listening skills. Conducted in German. (Writing Intensive Course) **PREREQS:** GER 313 and departmental approval.

GER 412. FOURTH-YEAR GERMAN (3). Focus on development of German writing, speaking, and listening skills. Conducted in German. **PREREQS:** GER 411 and departmental approval.

GER 413. FOURTH-YEAR GERMAN (3). Focus on development of German writing, speaking, and listening skills. Conducted in German. **PREREQS:** GER 412 and departmental approval.

GER 421. GERMAN LANGUAGE TANDEM (1). Optional course that can be taken to fine-tune advanced German speaking skills with the help of a native speaker. Graded P/N. This course is repeatable for a maximum of 6 credits.

GER 449. SELECTED TOPICS IN GERMAN LITERATURE (3). May be repeated for credit when topic varies. Conducted in German. This course is repeatable for a maximum of 9 credits. **PREREQS:** 9 upper-division credits in German.

GER 488. GERMAN STUDIES, GERMAN STUDY CENTER (1-12). May be repeated for when topic varies. Section 1: Topics, German language. Section 2: Practical work (exercises). Section 3: Topics, German arts and letters. Section 4: Topics, Germany and German society. This course is repeatable for a maximum of 12 credits.

GER 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GER 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GER 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

GER 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GER 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GER 511. FOURTH-YEAR GERMAN (3). Focus on development of German writing, speaking, and listening skills. Conducted in German. **PREREQS:** GER 313 and departmental approval.

GER 512. FOURTH-YEAR GERMAN (3). Focus on development of German writing, speaking, and listening skills. Conducted in German. **PREREQS:** GER 411 or GER 511 and departmental approval.

GER 513. FOURTH-YEAR GERMAN (3). Focus on development of German writing, speaking, and listening skills. Conducted in German. **PREREQS:** GER 412 or GER 512 and departmental approval.

GER 549. SELECTED TOPICS IN GERMAN LITERATURE (3). May be repeated for credit when topic varies. Conducted in German. This course is repeatable for a maximum of 9 credits. **PREREQS:** 9 upper-division credits in German.

GER 588. GERMAN STUDIES, GERMAN STUDY CENTER (1-12). May be repeated for credit when topic varies. Section 1: Topics, German language. Section 2: Practical work (exercises). Section 3:

Topics, German arts and letters. Section 4: Topics, Germany and German society. This course is repeatable for a maximum of 12 credits.

■ HEBREW COURSES

HEBR 111. INTRODUCTION TO HEBREW (4). Pronunciation, grammar, reading, writing, listening comprehension, speaking, conversation. Designed specifically for students with no prior training in Hebrew. Native and/or bilingual speakers of Hebrew will not receive credit for HEBR 111, HEBR 112, HEBR 113.

HEBR 112. INTERMEDIATE HEBREW (4). Pronunciation, grammar, reading, writing, listening comprehension, speaking, conversation. Designed specifically for students with no prior training in Hebrew. Native and/or bilingual speakers of Hebrew will not receive credit for HEBR 111, HEBR 112, HEBR 113. **PREREQS:** HEBR 111

HEBR 113. INTERMEDIATE HEBREW II (4). Pronunciation, grammar, reading, writing, listening comprehension, speaking, conversation. Designed specifically for students with no prior training in Hebrew. Native and/or bilingual speakers of Hebrew will not receive credit for HEBR 111, HEBR 112, HEBR 113. **PREREQS:** (HEBR 111 and HEBR 112)

HEBR 211. SECOND-YEAR HEBREW I (4). Further development of listening comprehension, speaking, reading, and writing skills. Native and/or bilingual speakers of Hebrew will not receive credit for HEBR 211. Taught via Ecampus only. **PREREQS:** HEBR 113

HEBR 212. SECOND-YEAR HEBREW II (4). Continued development of basic language skills, pronunciation, and vocabulary acquisition; introduction to extensive reading. Native and/or bilingual speakers of Hebrew will not receive credit for HEBR 211, HEBR 212, HEBR 213. Taught via Ecampus only. **PREREQS:** HEBR 211

HEBR 213. SECOND YEAR HEBREW III (4). Continued development of basic language skills, pronunciation, and vocabulary acquisition; introduction to extensive reading. Native and/or bilingual speakers of Hebrew will not receive credit for HEBR 211, 212, 213. **PREREQS:** HEBR 212

HEBR 231. *INTRODUCTION TO JEWISH CULTURE (3). An overview of Jewish culture from its origins to the present day. Students will compare and contrast the lifestyles, ideologies, religious and cultural practices of Jews living in Israel and the United States; two divergent cultures that developed from similar roots. Taught in English. Taught via Ecampus only. (Bacc Core Course)

■ ITALIAN COURSES

IT 111. FIRST-YEAR ITALIAN (4). Development of listening comprehension, speaking, reading, and writing skills. Designed for students with no previous training in Italian. Native speakers of Italian will not receive credit for IT 111, IT 112, IT 113. Not offered every year. **PREREQS:** IT 111, IT 112, IT 113 must be taken in order.

IT 112. FIRST-YEAR ITALIAN (4). Development of listening comprehension, speaking, reading, and writing skills. Designed for students with no previous training in Italian. Native speakers of Italian will not receive credit for IT 111, IT 112, IT 113. Not offered every year. **PREREQS:** IT 111

IT 113. FIRST-YEAR ITALIAN (4). Development of listening comprehension, speaking, reading, and writing skills. Designed for students with no previous training in Italian. Native speakers of Italian will not receive credit for IT 111, IT 112, IT 113. Not offered every year. **PREREQS:** IT 112

IT 188. ITALIAN STUDIES, ITALIAN STUDY CENTER (1-12). May be repeated for credit when topic varies. Section 1: Topics, Italian language. Section 2: Practical work (exercises). This course is repeatable for a maximum of 99 credits.

IT 199. SPECIAL STUDIES (1-16). May be repeated for credit when topic varies. See schedule of classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

IT 211. SECOND-YEAR ITALIAN (4). Further development of listening comprehension, speaking, reading, and writing skills. Native speakers of Italian will not receive credit for IT 211, IT 212, IT 213. Not offered every year. **PREREQS:** IT 113 and /or placement. IT 211, IT 212, IT 213 must be taken in order.

IT 212. SECOND-YEAR ITALIAN (4). Further development of listening comprehension, speaking, reading, and writing skills. Native speakers of Italian will not receive credit for IT 211, IT 212, IT 213. Not offered every year. **PREREQS:** IT 211 and /or placement.

IT 213. SECOND-YEAR ITALIAN (4). Further development of listening comprehension, speaking, reading, and writing skills. Native speakers of Italian will not receive credit for IT 211, IT 212, IT 213. Completion of IT 213 with a grade of C- or better satisfies BA requirement in foreign languages. Not offered every year. **PREREQS:** IT 212 and /or placement.

IT 299. SPECIAL STUDIES (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

IT 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

IT 410. INTERNSHIP (1-15).

IT 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

■ JAPANESE COURSES

JPN 111. FIRST-YEAR JAPANESE (4). Designed to help students develop an understanding of basic language structures and to acquire the ability to use them appropriately in a variety of practical, everyday social contexts. Primary focus is on verbal and non-verbal communication skills. Native and/or bilingual speakers of Japanese will not receive credit for JPN 111, JPN 112, JPN 113. Lec/lab/rec. **PREREQS:** JPN 111, JPN 112, JPN 113 must be taken in order.

JPN 112. FIRST-YEAR JAPANESE (4). Designed to help students develop an understanding of basic language structures and to acquire the ability to use them appropriately in a variety of practical, everyday social contexts. Primary focus is on verbal and non-verbal communication skills. Native and/or bilingual speakers of Japanese will not receive credit for JPN 111, JPN 112, JPN 113. Lec/lab/rec. **PREREQS:** JPN 111

JPN 113. FIRST-YEAR JAPANESE (4). Designed to help students develop an understanding of basic language structures and to acquire the ability to use them appropriately in a variety of practical, everyday social contexts. Primary focus is on verbal and non-verbal communication skills. Native and/or bilingual speakers of Japanese will not receive credit for JPN 111, JPN 112, JPN 113. Lec/lab/rec. **PREREQS:** JPN 112

JPN 199. SPECIAL STUDIES (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

JPN 211. SECOND-YEAR JAPANESE (4). Continued development of basic oral communication skills as required in a variety of social contexts. Initial development of reading skills. Native and/or bilingual speakers of Japanese will not receive credit for JPN 211, JPN 212, JPN 213. Lec/lab/rec. **PREREQS:** JPN 113 and /or placement.

JPN 212. SECOND-YEAR JAPANESE (4). Continued development of basic oral communication skills as required in a variety of social contexts. Initial development of reading skills. Native and/or bilingual speakers of Japanese will not receive credit for JPN 211, JPN 212, JPN 213. Lec/lab/rec. **PREREQS:** JPN 211 and /or placement.

JPN 213. SECOND-YEAR JAPANESE (4). Continued development of basic oral communication skills as required in a variety of social contexts. Initial development of reading skills. Native and/or bilingual speakers of Japanese will not receive credit for JPN 211, JPN 212, JPN 213. Completion of JPN 213 with a grade of C- or better satisfies BA requirement in foreign languages. Lec/rec. **PREREQS:** JPN 212 and /or placement.

JPN 299. SPECIAL STUDIES (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

JPN 311. THIRD-YEAR JAPANESE (3). Continued development of oral communication skills as required in a variety of social contexts. Further development of reading skills. Lec/lab/rec. **PREREQS:** JPN 213 or placement and departmental approval.

JPN 312. THIRD-YEAR JAPANESE (3). Continued development of oral communication skills as required in a variety of social contexts. Further development of reading skills. Lec/lab/rec. **PREREQS:** JPN 311 or placement and departmental approval.

JPN 313. THIRD-YEAR JAPANESE (3). Continued development of oral communication skills as required in a variety of social contexts. Further development of reading skills. Lec/rec. **PREREQS:** JPN 312 or placement and departmental approval.

JPN 329. SPECIAL TOPICS IN LANGUAGE, CULTURE, OR LITERATURE (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

JPN 331. *JAPANESE CULTURE (3). An introductory survey of Japanese history, arts, literature, society, and traditions from the ancient to the mid-19th century. Taught in English. JPN 331, JPN 332, JPN 333 need not be taken in order. May not be offered every year. (NC) (Bacc Core Course) **PREREQS:** Sophomore standing.

JPN 332. *JAPANESE CULTURE (3). An introductory survey of Japanese history, arts, literature, society, and traditions from the ancient to the mid-19th century. Taught in English. JPN 331, JPN 332, JPN 333 need not be taken in order. May not be offered every year. (NC) (Bacc Core Course) **PREREQS:** Sophomore standing.

JPN 333. *JAPANESE CULTURE (3). A survey of Japan from the mid-19th century to the present in areas including arts, literature, business, education, society, politics, and foreign relations. Taught in English. JPN 331, JPN 332, JPN 333 need not be taken in order. May not be offered every year. (NC) (Bacc Core Course) **PREREQS:** Sophomore standing.

JPN 379. PROCTOR EXPERIENCE (1-2). Supervised practicum for advanced students, with assignment as proctor or tutor in lower-division Japanese courses. No credit may be used to satisfy requirements for a minor in Japanese. Graded P/N. This course is repeatable for a maximum of 6 credits. **PREREQS:** Completion of third-year Japanese with a minimum 3.00 GPA in that sequence and prior authorization from supervisor.

JPN 388. JAPANESE STUDIES, JAPANESE STUDY CENTER (1-12). May be repeated for credit when topic varies. This course is repeatable

for a maximum of 12 credits.

JPN 399. SPECIAL TOPICS (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

JPN 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

JPN 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

JPN 410. INTERNSHIP (1-15).

JPN 411. FOURTH-YEAR JAPANESE (3). Further development of conversational, reading, and writing skills. Readings include excerpts from contemporary essays, short stories, novels, plays, and newspaper articles. Not offered every year. **PREREQS:** JPN 313 or placement and departmental approval. JPN 411, JPN 412, JPN 413 must be taken in order.

JPN 412. FOURTH-YEAR JAPANESE (3). Further development of conversational, reading, and writing skills. Readings include excerpts from contemporary essays, short stories, novels, plays, and newspaper articles. Not offered every year. **PREREQS:** JPN 411 or placement and departmental approval.

JPN 413. FOURTH-YEAR JAPANESE (3). Further development of conversational, reading, and writing skills. Readings include excerpts from contemporary essays, short stories, novels, plays, and newspaper articles. Not offered every year. **PREREQS:** JPN 412 or placement and departmental approval.

JPN 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

JPN 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

■ KOREAN COURSES

KOR 111. FIRST-YEAR KOREAN (4). For students with no prior training in Korean. Basic language skills along with cultural understanding by introducing the history of Hangul, traditional holidays, games, songs, foods and drama. Provides the Korean alphabet (Hangul), basic vocabulary, grammar, listening, speaking, reading, and writing skills. Three areas of focus: (1) reading and writing the Korean alphabet; (2) basic colloquial expressions; and (3) cultural understanding.

KOR 112. FIRST-YEAR KOREAN (4). Basic language skills along with cultural understanding by introducing the history of Hangul, traditional holidays, games, songs, foods and drama. Provides the Korean alphabet (Hangul), basic vocabulary, grammar, listening, speaking, reading, and writing skills. Three areas of concentration: (1) reading and writing the Korean alphabet, (2) basic colloquial expressions, and (3) cultural understanding. **PREREQS:** KOR 111

KOR 113. FIRST-YEAR KOREAN (4). Designed to increase fluency in listening, speaking, reading and writing skills through various topics that are relevant to students' life; sports, health, experiences, housing. Enlarge vocabulary and knowledge of grammar and sentence structure with honorifics, adjectives, connectives, and comparatives. Discuss Korean culture and literature using folk tales. **PREREQS:** KOR 112

■ LATIN COURSES

LAT 111. FIRST-YEAR LATIN (4). Basics of the Latin language, including grammar, syntax, and vocabulary for the purpose of reading and understanding Latin texts.

LAT 112. FIRST-YEAR LATIN (4). Continues to introduce students to the basics of the Latin language, including grammar, syntax, and vocabulary for the purpose of reading and understanding Latin texts. **PREREQS:** LAT 111

LAT 113. FIRST-YEAR LATIN (4). Continues to introduce students to the basics of the Latin language, including grammar, syntax, and vocabulary for the purpose of reading and understanding Latin texts. **PREREQS:** LAT 112

■ LINGUISTICS COURSES

LING 111. CLASSROOM STUDY OF A LESS COMMONLY TAUGHT LANGUAGE (4). Beginning classroom-based instruction of a language otherwise not taught at OSU. Skill areas addressed include reading, writing, speaking, listening and culture. Not for students who have previous proficiency in the target language. May be repeated for credit for different languages. For a master-apprentice approach, enroll instead in the LING 114, LING 115, LING 116 sequence. This course is repeatable for a maximum of 12 credits. **PREREQS:** LING 111, LING 112, LING 113 must be taken in sequence.

LING 112. CLASSROOM STUDY OF A LESS COMMONLY TAUGHT LANGUAGE (4). Beginning classroom-based instruction of a language otherwise not taught at OSU. Skill areas addressed include reading, writing, speaking, listening and culture. Not for students who have previous proficiency in the target language. May be repeated for credit for different languages. For a master-apprentice approach, enroll instead in the LING 114, LING 115, LING 116 sequence. This course is repeatable for a maximum of 12 credits. **PREREQS:** LING 111, LING 112, LING 113 must be taken in sequence.

LING 113. CLASSROOM STUDY OF A LESS COMMONLY TAUGHT LANGUAGE (4). Beginning classroom-based instruction of a language otherwise not taught at OSU. Skill areas addressed include reading, writing, speaking, listening and culture. Not for students who have previous proficiency in the target language. May be repeated for credit for different languages. For a master-apprentice approach, enroll instead in the LING 114, LING 115, LING 116 sequence. This course is repeatable for a maximum of 12 credits. **PREREQS:** LING 111, LING 112, LING 113 must be taken in sequence.

LING 114. MASTER/APPRENTICE STUDY OF A LESS COMMONLY TAUGHT LANGUAGE (1-4). LING 114, LING 115, LING 116 provide context-rich beginning language instruction, in close collaboration with a native speaker, of a language otherwise not taught at OSU. Learners work toward a level of communicative proficiency approaching the intermediate low level in each of the primary skill areas. Four credits of one language are required before moving on to the next course in the sequence. May be repeated for credit for up to three languages. Not for students who have previous proficiency in the target language. This course is repeatable for a maximum of 12 credits.

LING 115. MASTER/APPRENTICE STUDY OF A LESS COMMONLY TAUGHT LANGUAGE (1-4). LING 114, LING 115, LING 116 provide context-rich beginning language instruction, in close collaboration with a native speaker, of a language otherwise not taught at OSU. Learners work toward a level of communicative proficiency approaching the intermediate low level in each of the primary skill areas. Four credits of one language are required before moving on to the next course in the sequence. May be repeated for credit for up to three languages. Not for students who have previous proficiency in the target language. This course is repeatable for a maximum of 12 credits.

LING 116. MASTER/APPRENTICE STUDY OF A LESS COMMONLY TAUGHT LANGUAGE (1-4). LING 114, LING 115, LING 116 provide

context-rich beginning language instruction, in close collaboration with a native speaker, of a language otherwise not taught at OSU. Learners work toward a level of communicative proficiency approaching the intermediate low level in each of the primary skill areas. Four credits of one language are required before moving on to the next course in the sequence. May be repeated for credit for up to three languages. Not for students who have previous proficiency in the target language. This course is repeatable for a maximum of 12 credits.

LING 199. SPECIAL TOPICS (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

LING 208. *WESTERN CULTURE STUDY ABROAD (3). Overseas study of the history and contemporary form of important features of Western culture. Based on at least 10 weeks of studying abroad. **CROSSLISTED** as ANTH 208. (Bacc Core Course) **PREREQS:** Must be arranged with instructor prior to registration. Simultaneous enrollment in Study Abroad program.

LING 209. *CULTURAL DIVERSITY STUDY ABROAD (3). Overseas study of non-Western cultures. Based on at least 10 weeks of studying abroad. **CROSSLISTED** as ANTH 209. (Bacc Core Course) **PREREQS:** Must be arranged with instructor prior to registration. Must also be enrolled in the Study Abroad program.

LING 251. *LANGUAGES OF OREGON (3). Basic lessons in languages spoken in Oregon's minority language communities presented by native informants; discussion, language analysis, and assessment facilitated by linguistics faculty. Languages presented will vary. (Bacc Core Course)

LING 251H. *LANGUAGES OF OREGON (3). Basic lessons in languages spoken in Oregon's minority language communities presented by native informants; discussion, language analysis, and assessment facilitated by linguistics faculty. Languages presented will vary. (Bacc Core Course) **PREREQS:** Honors College approval required.

LING 299. SPECIAL TOPICS (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

LING 359. SELECTED TOPICS IN LINGUISTICS (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

LING 399. SPECIAL TOPICS (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

LING 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

LING 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

LING 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

LING 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

LING 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

LING 410. INTERNSHIP (1-15). This course is repeatable for a maximum of 16 credits.

LING 451. GENERAL LINGUISTICS (3). Language systems; comparative philology; historical, descriptive, and structural linguistics; semantics; phonetics and phonemics. Not offered every year. **PREREQS:** 9 credits upper-division foreign language training or equivalent.

LING 499. SPECIAL TOPICS (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

LING 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

LING 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

LING 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

LING 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

LING 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

LING 509. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

LING 510. INTERNSHIP (1-15). This course is repeatable for a maximum of 15 credits. **PREREQS:** Departmental approval required.

LING 545. METHODS AND MATERIALS FOR SECOND LANGUAGE ACQUISITION (4). Historical and contemporary approaches to teaching and assessment in the second language classroom; emphasis on evaluating second language teaching methods and materials. **PREREQS:** Departmental approval required.

LING 551. GENERAL LINGUISTICS (3). Language systems; comparative philology; historical, descriptive, and structural linguistics; semantics; phonetics and phonemics. Not offered every year. **PREREQS:** 9 credits upper-division foreign language training or equivalent.

LING 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

■ QUEER STUDIES COURSES

QS 262. *INTRODUCTION TO QUEER STUDIES (3). Centering itself on activism and scholarship, this course examines homophobia's and transphobia's relationship with racism, colonialism, sexism, ableism, classism and other forms of oppression. Introduces key concepts, histories, and political frameworks within Lesbian, Gay, Bisexual, Transgender, and Queer political movements. (Bacc Core Course) **CROSSLISTED** as WGSS 262.

QS 262H. *INTRODUCTION TO QUEER STUDIES (3). Centering itself on activism and scholarship, this course examines homophobia's and transphobia's relationship with racism, colonialism, sexism, ableism, classism and other forms of oppression. Introduces key concepts, historic histories, and political frameworks within Lesbian, Gay, Bisexual, Transgender, and Queer political movements. (Bacc Core Course) **CROSSLISTED** as WGSS 262H. **PREREQS:** Honors College approval required.

QS 299. SPECIAL TOPICS (3). This course is repeatable for a maximum of 9 credits.

QS 364. *TRANSGENER POLITICS (3). Addresses transgender politics—including transsexual, genderqueer, and gender non-conforming issues—through feminist and intersectional approaches by analyzing transgender theories, arts, and activism. (Bacc Core Course) **CROSSLISTED** as WGSS 364. **PREREQS:** Sophomore standing.

QS 399. SPECIAL TOPICS IN QUEER STUDIES (3). This course is repeatable for a maximum of 12 credits.

QS 409. PRACTICUM: PROJECTS IN QUEER STUDIES (1-12). Capstone projects bring theory into practice through research, design, and implementation of a project that synthesizes and demonstrates learning in the Queer Studies program. This course is repeatable for a maximum of 12 credits. **PREREQS:** Junior or senior standing.

QS 431. *QUEER OF COLOR CRITIQUES (3). "Queer of color critiques" refers to political theories and activism that emerge from LGBTQ people of color to examine the intersections between race, sexuality and gender. This course addresses these intersections through theory, history, and activism. (Bacc Core Course) **CROSSLISTED** as ES 431 and **WGSS 431. PREREQS:** Junior standing.

QS 462. *QUEER THEORIES (3). Engages key themes and critical frameworks in queer theories. Topics include histories of sexuality; forms of oppression, including heterosexism, homophobia, and transphobia; resistance to oppression; violence against LGBTQ people; queer activism; diverse experiences of sexuality; and representations in literature, art, and popular media. (Bacc Core Course) **CROSSLISTED** as **WGSS 462/WGSS 562.**

QS 472. ^INDIGENOUS TWO-SPIRIT AND QUEER STUDIES (3). "Two-spirit" refers to North American indigenous genders outside of European male/female binaries. Two-spirit communities argue for decolonization as a central political struggle, calling all people to unlearn settler colonial gender/sexuality on Native land. This course addresses indigenous two-spirit/GLBTQ issues through theory, literature, activism, and art. **CROSSLISTED** as **ES 472, WGSS 472 (Writing Intensive Course) PREREQS:** QS 262 or ES 242 or **WGSS 414** or instructor permission

QS 473. TRANSGENDER LIVES (3). Many people in our Western cultures perceive gender as bimodal and fixed from birth. Individuals whose identity of self does not match the individual's biological sex face significant social pressures to conform to gender norms. Students will be introduced to the biological, social and cultural contexts for transgendered individuals. **CROSSLISTED** as **WGSS 473. PREREQS:** **WGSS 262** or **QS 262** or equivalent.

QS 477. *QUEER/TRANS PEOPLE OF COLOR ARTS AND ACTIVISM (3). LGBTQ people of color often engage struggles for social justice through artistic movements. This course will focus on arts by LGBTQ people of color and the way these artistic movements contribute to activism that interrupts interlocking systems of oppression. (Bacc Core Course) **CROSSLISTED** as **ES 477/ES 577, WGSS 477/WGSS 577. PREREQS:** **QS 262** and **QS 462**

QS 499. SPECIAL TOPICS IN QUEER STUDIES (3). Topics in gay, lesbian, bisexual, transgender, and queer issues and scholarship. May be repeated for credit when topic varies. This course is repeatable for a maximum of 12 credits.

QS 524. TRANS/GENDER POLITICS (3). Addresses transgender politics—including transsexual, genderqueer, and gender non-conforming issues—through feminist and intersectional approaches by analyzing transgender theories, arts, and activism. **CROSSLISTED** as **WGSS 524. PREREQS:** Graduate student standing.

QS 531. QUEER OF COLOR CRITIQUES (3). "Queer of color critiques" refers to political theories and activism that emerge from LGBTQ people of color to examine the intersections between race, sexuality and gender. This course addresses these intersections through theory, history, and activism. **CROSSLISTED** as **ES 531** and **WGSS 531. PREREQS:** Junior standing.

QS 562. QUEER THEORIES (3). Engages key themes and critical frameworks in queer theories. Topics include histories of sexuality; forms of oppression, including heterosexism, homophobia, and transphobia; resistance to oppression; violence against LGBTQ people; queer activism; diverse experiences of sexuality; and representations in literature, art, and popular media. **CROSSLISTED** as **WGSS 462/WGSS 562.**

QS 572. INDIGENOUS TWO-SPIRIT AND QUEER STUDIES (3). "Two-spirit" refers to North American indigenous genders outside of European male/female binaries. Two-spirit communities argue for decolonization as a central political struggle, calling all people to unlearn settler colonial gender/sexuality on Native land. This course addresses indigenous two-spirit/GLBTQ issues through theory, literature, activism, and art. **CROSSLISTED** as **ES 572, WGSS 572 PREREQS:** **QS 262** or **ES 242** or **WGSS 414** or **WGSS 514** or instructor permission

QS 573. TRANSGENDER LIVES (3). Many people in our Western cultures perceive gender as bimodal and fixed from birth. Individuals whose identity of self does not match the individual's biological sex face significant social pressures to conform to gender norms. Students will be introduced to the biological, social and cultural contexts for transgendered individuals. **CROSSLISTED** as **WGSS 573. PREREQS:** **WGSS 262** or **QS 262** or equivalent.

QS 577. QUEER/TRANS PEOPLE OF COLOR ARTS AND ACTIVISM (3). LGBTQ people of color often engage struggles for social justice through artistic movements. This course will focus on arts by LGBTQ people of color and the way these artistic movements contribute to activism that interrupts interlocking systems of oppression. **CROSSLISTED** as **ES 477/ES 577, WGSS 477/ WGSS 577. PREREQS:** **QS 262** and **QS 462**

QS 599. SPECIAL TOPICS IN QUEER STUDIES (3). Topics in gay, lesbian, bisexual, transgender, and queer issues and scholarship. May be repeated for credit when topic varies. This course is repeatable for a maximum of 12 credits.

■ RUSSIAN COURSES

RUS 111. FIRST-YEAR RUSSIAN (4). Pronunciation, intonation, grammar, reading, writing, listening comprehension and conversation. Designed for students with no prior training in Russian. Native and/or bilingual speakers of Russian will not receive credit for **RUS 111, RUS 112, RUS 113. PREREQS:** **RUS 111, RUS 112, RUS 113** must be taken in order.

RUS 112. FIRST-YEAR RUSSIAN (4). Pronunciation, intonation, grammar, reading, writing, listening comprehension and conversation. Designed for students with no prior training in Russian. Native and/or bilingual speakers of Russian will not receive credit for **RUS 111, RUS 112, RUS 113. PREREQS:** **RUS 111**

RUS 113. FIRST-YEAR RUSSIAN (4). Pronunciation, intonation, grammar, reading, writing, listening comprehension and conversation. Designed for students with no prior training in Russian. Native and/or bilingual speakers of Russian will not receive credit for **RUS 111, RUS 112, RUS 113. PREREQS:** **RUS 112**

RUS 199. SPECIAL STUDIES (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

RUS 211. SECOND-YEAR RUSSIAN (4). Further development of listening comprehension, speaking, reading, and writing skills. Native and/or bilingual speakers of Russian will not receive credit for **RUS 211, RUS 212, RUS 213. PREREQS:** **RUS 113** and/or placement. **RUS 211, RUS 212, RUS 213** must be taken in order.

RUS 212. SECOND-YEAR RUSSIAN (4). Further development of listening comprehension, speaking, reading, and writing skills. Native and/or bilingual speakers of Russian will not receive credit for **RUS 211, RUS 212, RUS 213. PREREQS:** **RUS 211** and/or placement.

RUS 213. SECOND-YEAR RUSSIAN (4). Further development of listening comprehension, speaking, reading, and writing skills. Native and/or bilingual speakers of Russian will not receive credit for **RUS 211, RUS 212, RUS 213.** Completion of **RUS 213** with a grade of C- or better satisfies BA requirement in foreign languages. **PREREQS:** **RUS 212** and/or placement.

RUS 231. *RUSSIAN CULTURE (3). Introduction to basic features of Russian culture originating in the past and continuing into the present. Aspects of history, politics, economics, geography, art, music, literature, and everyday life. Compares Russian culture with Western European and American culture. **RUS 231: Old Russia; RUS 232: 19th Century; RUS 233: 20th Century.** Taught in English. Need not be taken in order. (H) (Bacc Core Course)

RUS 232. *RUSSIAN CULTURE (3). Introduction to basic features of Russian culture originating in the past and continuing into the present. Aspects of history, politics, economics, geography, art, music, literature, and everyday life. Compares Russian culture with Western European and American culture. **RUS 231: Old Russia; RUS 232: 19th Century; RUS 233: 20th Century.** Taught in English. Need not be taken in order. (H) (Bacc Core Course)

RUS 233. *RUSSIAN CULTURE (3). Introduction to basic features of Russian culture originating in the past and continuing into the present. Aspects of history, politics, economics, geography, art, music, literature, and everyday life. Compares Russian culture with Western European and American culture. **RUS 231: Old Russia; RUS 232: 19th Century; RUS 233: 20th Century.** Taught in English. Need not be taken in order. (H) (Bacc Core Course)

RUS 299. SPECIAL STUDIES (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

RUS 311. THIRD-YEAR RUSSIAN (3). Extensive practice in writing, reading, and speaking; refinement of grammar and pronunciation. **PREREQS:** **RUS 213** and departmental approval. **RUS 311, RUS 312, RUS 313** must be taken in order.

RUS 312. THIRD-YEAR RUSSIAN (3). Extensive practice in writing, reading, and speaking; refinement of grammar and pronunciation. **PREREQS:** **RUS 311** and departmental approval.

RUS 313. THIRD-YEAR RUSSIAN (3). Extensive practice in writing, reading, and speaking; refinement of grammar and pronunciation. **PREREQS:** **RUS 312** and departmental approval.

RUS 329. SPECIAL TOPICS IN LANGUAGE, CULTURE, AND/OR LITERATURE (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 16 credits.

RUS 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

RUS 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

RUS 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

RUS 410. INTERNSHIP (1-15).

RUS 411. FOURTH-YEAR RUSSIAN (3). Emphasis on developing writing, speaking, and listening skills for proficiency progressing from textbook Russian to real-life Russian. Includes vocabulary study and some grammar review. Conducted in Russian. **PREREQS:** RUS 313 and departmental approval.

RUS 412. FOURTH-YEAR RUSSIAN (3). Emphasis on developing writing, speaking, and listening skills, so that student's proficiency progresses from textbook Russian to real-life Russian. Includes vocabulary study and some grammar review. Conducted in Russian. **PREREQS:** RUS 411 and departmental approval.

RUS 413. FOURTH-YEAR RUSSIAN (3). Emphasis on developing writing, speaking, and listening skills, so that the student's proficiency progresses from textbook Russian to real-life Russian. Includes vocabulary study and some grammar review. Conducted in Russian. **PREREQS:** RUS 412 and departmental approval.

RUS 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

RUS 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

RUS 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

■ SPANISH COURSES

SPAN 111. FIRST-YEAR SPANISH (4). Development of listening comprehension, speaking, reading, and writing skills. Native speakers and bilingual speakers will not receive credit for SPAN 111, SPAN 112, SPAN 113. Lec/rec. **PREREQS:** Students with previous study of Spanish are admitted only by departmental approval. SPAN 111, SPAN 112, SPAN 113 must be taken in order.

SPAN 112. FIRST-YEAR SPANISH (4). Development of listening comprehension, speaking, reading, and writing skills. Native speakers and bilingual speakers may not receive credit for SPAN 111, SPAN 112, SPAN 113. Lec/rec. **PREREQS:** SPAN 111 or Placement Test and students with previous study of Spanish are admitted only by departmental approval. SPAN 111, SPAN 112, SPAN 113 must be taken in order.

SPAN 113. FIRST-YEAR SPANISH (4). Development of listening comprehension, speaking, reading, and writing skills. Native speakers and bilingual speakers may not receive credit for SPAN 111, SPAN 112, SPAN 113. Lec/rec. **PREREQS:** SPAN 112 or Placement Test and students with previous study of Spanish are admitted only by departmental approval. SPAN 111, SPAN 112, SPAN 113 must be taken in order.

SPAN 117. FIRST-YEAR SPANISH-COMPLETE SEQUENCE (12). Introduction to Spanish. Listening, speaking, reading, and writing skills developed. Students must take all twelve credits. Entire first-year sequence in eight weeks. **PREREQS:** Students with previous study of Spanish are admitted only by approval of the School of Language, Culture, and Society.

SPAN 188. HISPANIC STUDIES, HISPANIC STUDY CENTERS (1-12). Section 1: Topics, Hispanic language. Section 2: Practical work (exercises); Section 3: Topics, Hispanic arts and letters. Section 4: Topics, Hispanic society.

SPAN 199. SPECIAL STUDIES (1-3). This course is repeatable for a maximum of 9 credits.

SPAN 211. SECOND-YEAR SPANISH (4). Further development of listening comprehension, speaking, reading, and writing skills. Native speakers will not receive credit for SPAN 211,

SPAN 212, SPAN 213. **PREREQS:** SPAN 113 or Placement Test and SPAN 211, SPAN 212, SPAN 213 must be taken in order.

SPAN 212. SECOND-YEAR SPANISH (4). Further development of listening comprehension, speaking, reading, and writing skills. Native speakers may not receive credit for SPAN 211, SPAN 212, SPAN 213. **PREREQS:** SPAN 211 or Placement Test

SPAN 213. SECOND-YEAR SPANISH (4). Further development of listening comprehension, speaking, reading, and writing skills. Native speakers may not receive credit for SPAN 211, SPAN 212, SPAN 213. Completion if SPAN 213 with a grade of C- or better satisfies BA requirement for foreign languages. **PREREQS:** SPAN 212 or Placement Test

SPAN 214. SECOND-YEAR SPANISH FOR NATIVE SPEAKERS (4). Designed for native speakers who learned Spanish in a home environment. Introduction to written Spanish. **PREREQS:** SPAN 214, SPAN 215, SPAN 216 must be taken in order.

SPAN 215. SECOND-YEAR SPANISH FOR NATIVE SPEAKERS (4). Designed for native speakers who learned Spanish in a home environment. Introduction to written Spanish. **PREREQS:** SPAN 215

SPAN 216. SECOND-YEAR SPANISH FOR NATIVE SPEAKERS (4). Designed for native speakers who learned Spanish in a home environment. Introduction to written Spanish. Completion of SPAN 216 with a grade of C- or better satisfies BA requirement for foreign languages. **PREREQS:** SPAN 216

SPAN 217. SECOND-YEAR SPANISH-COMPLETE SEQUENCE (12). Intermediate Spanish. Listening, speaking, reading, and writing skills developed. Students must take all 12 credits. Entire second-year sequence in eight weeks. **PREREQS:** SPAN 113 or SPAN 117

SPAN 236. *CONTEMPORARY LATIN AMERICAN CULTURE (3). Students will examine the main currents of modern Latin American culture since the beginning of the 20th century. Key subjects covered include the mural movement, "magical realism" in postwar literature, syncretism in the region's music and religion, and environmentalism in literature and the arts. (Bacc Core Course)

SPAN 237. *U.S. LATINO/A IDENTITIES AND CULTURES (3). An introduction to past and contemporary experiences of Latinos/as in the U.S. related to patterns of (im)migration as well as sociohistorical and political events that have shaped U.S. Latino identities. In addition, the course will explore the current social, political, economical and cultural status and experiences of Latinos/as in different regions of the United States. (Taught in English) (Bacc Core Course)

SPAN 288. HISPANIC STUDIES, HISPANIC STUDY CENTERS (1-12). Section 1: Topics, Hispanic language; Section 2: Practical work (exercises); Section 3: Topics, Hispanic arts and letters; Section 4: Topics, Hispanic society. This course is repeatable for a maximum of 12 credits.

SPAN 299. SPECIAL STUDIES (1-3). This course is repeatable for a maximum of 9 credits.

SPAN 311. ADVANCED SPANISH GRAMMAR (3). Students further develop language skills acquired in earlier courses while studying more complex structural aspects of the language through the application of grammar concepts in composition and other language tasks. **PREREQS:** SPAN 213 or passing score on placement tests.

SPAN 312. INTERMEDIATE WRITING SKILLS (3). Focuses on written communication in Spanish. Authentic texts are used to identify writing processes and products and see how composition is informed by cultural considerations. Special attention will be paid to the author's purpose

and the distinctiveness of the target audience. Students will create original written works and reinforce oral communication skills through class discussions. **PREREQS:** SPAN 213 or passing score on placement tests.

SPAN 313. SPANISH LANGUAGE THROUGH CULTURE (3). Development of Spanish language through an exploration of cultural products, perspectives and practices of Spanish-speaking communities around the world. **PREREQS:** SPAN 213 or passing score on placement tests.

SPAN 314. THIRD-YEAR SPANISH FOR NATIVE SPEAKERS (3). Extensive practice in reading, writing, and speaking; refinement of spelling, grammar and vocabulary within a dynamic cultural context. Native speakers should take SPAN 314, SPAN 315, SPAN 316 instead of SPAN 311, SPAN 312, SPAN 313; credit is not allowed for both. **PREREQS:** SPAN 216 or placement. SPAN 314, SPAN 315, SPAN 316 must be taken in order.

SPAN 315. THIRD-YEAR SPANISH FOR NATIVE SPEAKERS (3). Extensive practice in reading, writing, and speaking; refinement of spelling, grammar and vocabulary within a dynamic cultural context. Native speakers should take SPAN 314, SPAN 315, SPAN 316 instead of SPAN 311, SPAN 312, SPAN 313; credit is not allowed for both. **PREREQS:** SPAN 314 or placement. SPAN 314, SPAN 315, SPAN 316 must be taken in order.

SPAN 316. THIRD-YEAR SPANISH FOR NATIVE SPEAKERS (3). Extensive practice in reading, writing, and speaking; refinement of spelling, grammar and vocabulary within a dynamic cultural context. Native speakers should take SPAN 314, SPAN 315, SPAN 316 instead of SPAN 311, SPAN 312, SPAN 313; credit is not allowed for both. **PREREQS:** SPAN 315 or placement. SPAN 314, SPAN 315, SPAN 316 must be taken in order.

SPAN 317. DIRECTED READING AND WRITING IN SPANISH (3). Emphasis on reading comprehension and improving writing ability. Students will build on their language skills and cultural awareness using different forms of literary expression from the Spanish-speaking world. **PREREQS:** 9 credits of upper-division SPAN.

SPAN 318. INTRODUCTION TO SPANISH LANGUAGE LITERATURE (3). Provides the literary background and analytical tools for students to discuss Spanish language literature with some depth and prepares students for more advanced literature courses. Some discussion of Latin American and Spanish history, politics and culture will provide a context for the readings. **PREREQS:** 9 credits of upper-division Spanish or instructor approval.

SPAN 319. SPANISH FOR BUSINESS (3). Introduction to the Spanish business world and commercial language. Development of business vocabulary, discussion, practice in writing resumes, business letters and reports. Conducted in Spanish. May not be offered every year. **PREREQS:** SPAN 312 or instructor approval required.

SPAN 320. SPANISH CONVERSATION (3). Extensive listening and speaking practice in Spanish, and systematic contact with Latin culture. Emphasis on vocabulary, pronunciation, intonation, and comprehension. Native speakers of Spanish are not eligible to take this course. May be used to satisfy requirements for the major or minor. **PREREQS:** 6 credits of upper-division Spanish.

SPAN 327. MEXICAN-AMERICAN LIT & COMP FOR SPAN HERITAGE LANG LEARNERS (3). Combines the study of fiction, drama, and poetry in Spanish language produced by people of Mexican origin in what is today the United States, with intensive practice in the writing of formal Spanish. Students are encouraged to develop their independent thinking and analytical ability. Designed for students from a Spanish-speaking background. **PREREQS:** SPAN 316 or instructor approval.

SPAN 331. *THE CULTURES OF SPAIN AND PORTUGAL (3). Historical development of the cultures and societies of the Iberian peninsula. Taught in Spanish. (H) (Bacc Core Course)
PREREQS: Completion of 9 credits from SPAN 311, SPAN 312, SPAN 313, SPAN 317, SPAN 318.

SPAN 332. *THE CULTURES OF SPAIN AND PORTUGAL (3). Historical development of the cultures and societies of the Iberian peninsula. Taught in Spanish. (H) (Bacc Core Course)
PREREQS: Completion of 9 credits from SPAN 311, SPAN 312, SPAN 313, SPAN 317, SPAN 318.

SPAN 333. CULTURES OF SPAIN AND PORTUGAL (3). Historical development of the cultures and societies of today's Iberian peninsula. Taught in Spanish. **PREREQS:** Completion of 9 credits from SPAN 311, SPAN 312, SPAN 313, SPAN 317, SPAN 318.

SPAN 336. *LATIN AMERICAN CULTURE (3). Historical development of the cultures and societies of Latin America, with an emphasis on Spanish- and Portuguese-speaking peoples. Taught in Spanish. (H) (Bacc Core Course)
PREREQS: Completion of 9 credits from SPAN 311, SPAN 312, SPAN 313, SPAN 317, SPAN 318.

SPAN 337. *LATIN AMERICAN CULTURE (3). Historical development of the cultures and societies of Latin America, with an emphasis on Spanish- and Portuguese-speaking peoples. Taught in Spanish. (H) (Bacc Core Course)
PREREQS: Completion of 9 credits from SPAN 311, SPAN 312, SPAN 313, SPAN 317, SPAN 318.

SPAN 338. *LATIN AMERICAN CULTURE (3). Historical development of the cultures and societies of Latin America, with an emphasis on Spanish- and Portuguese-speaking peoples. Taught in Spanish. (H) (Bacc Core Course)
PREREQS: Completion of 9 credits from SPAN 311, SPAN 312, SPAN 313, SPAN 317, SPAN 318.

SPAN 339. MEXICAN IMMIGRANT EXPERIENCE IN THE UNITED STATES (3). An interdisciplinary analysis of the immigration from Mexico to the United States. It will include discussions of literary, cultural and political accounts. Emphasis on the development of presentational communication skills in Spanish. Taught in Spanish. **PREREQS:** 12 credits from SPAN 314, SPAN 315, SPAN 316, SPAN 317, SPAN 318, SPAN 331, SPAN 332, SPAN 336, SPAN 337, SPAN 338.

SPAN 344. SELECTED TOPICS IN LITERATURE (3). Taught in Spanish. May be repeated for credit when topic varies. See Schedule of Classes for current term offering. This course is repeatable for a maximum of 9 credits. **PREREQS:** Completion of 9 credits from SPAN 311, SPAN 312, SPAN 313, SPAN 317, SPAN 318.

SPAN 350. PHONETICS AND PRONUNCIATION (3). An exploration of the organs of speech and hearing, acoustic analysis, and transcription of native and learner Spanish speech samples. **PREREQS:** 3 credits of upper-division Spanish.

SPAN 351. HISPANIC LINGUISTICS (3). Scientific approach to the structure of the Spanish language: syntax, phonology, word formation, dialectal differences. Taught in Spanish. Recommended for teacher certification. **PREREQS:** SPAN 350

SPAN 379. PROCTOR EXPERIENCE (1). Supervised practicum for advanced students, with assignments as proctors or tutors in lower-division Spanish language courses. No more than 2 credits may be used to satisfy degree requirements for a major in Spanish; no credit may be used to satisfy requirements for a minor in Spanish. Graded P/N. This course is repeatable for a maximum of 3 credits. **PREREQS:** Completion of 21 upper-division credits in Spanish with a minimum 3.00 GPA.

SPAN 388. HISPANIC STUDIES, HISPANIC STUDY CENTERS (1-12). Section 1: Topics, Hispanic language. Section 2: Practical work

(exercises). Section 3: Topics, Hispanic arts and letters. Section 4: Topics, Hispanic society. This course is repeatable for a maximum of 12 credits.

SPAN 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

SPAN 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

SPAN 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

SPAN 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

SPAN 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

SPAN 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

SPAN 410. INTERNSHIP (1-15).

SPAN 411. SPECIALIZED GRAMMAR OR LINGUISTICS TOPICS (3). Students develop an in-depth knowledge of various linguistic aspects of Spanish, particularly in regard to problematic grammatical structures and the development of writing proficiency. The main focus is on integrating a thorough understanding of grammatical structures into writing using selected literary works as models. Students analyze their own linguistic progress and apply this meta-knowledge to their writing. **PREREQS:** 18 credits of upper-division Spanish.

SPAN 412. ADVANCED COMPOSITION (3). Emphasis on creative writing. Students will read and discuss a series of stories with the same theme, then write their own. The subjunctive and other advanced grammar topics will be reviewed and incorporated into the writing activities. Taught in Spanish. **PREREQS:** 18 credits of upper-division Spanish or instructor approval.

SPAN 413. ADVANCED COMMUNICATION SKILLS (3). Contextualized exploration of skills outlined in the National Standards Project's "Five Cs" and in the additional area of critical consciousness with particular emphasis on language used in journalism and the mass media. This course meets 3 hours per week. **PREREQS:** 18 credits of upper-division Spanish or instructor approval.

SPAN 435. SPECIAL TOPICS IN LATIN AMERICAN CULTURE (3). Historical and contemporary aspects of the cultures of Latin America. May include material relevant to Spain and U.S. Latinos. See Schedule of Classes for current term offering. May be repeated for credit when topic varies. This course is repeatable for a maximum of 9 credits. **PREREQS:** 18 credits of upper-division Spanish or instructor approval.

SPAN 438. ^SELECTED TOPICS IN LUSO-HISPANIC CULTURE (3). Contemporary aspects of the cultures of Spain, Portugal, or Latin America with a cross-cultural perspective. Topics and language of instruction vary. See Schedule of Classes for current term offering. May be repeated for credit when topic varies. Not offered every year. (Writing Intensive Course) This course is repeatable for a maximum of 9 credits. **PREREQS:** Completion of 6 credits from SPAN 331, SPAN 332, SPAN 333, SPAN 336, SPAN 337, SPAN 338.

SPAN 439. ^TOPICS IN MEXICAN CULTURE AS EVIDENCED THROUGH MEXICAN FILM (3). Critical analysis and evaluation of films as cultural texts that open up a window into Mexican society. Movies with strong sexual content, explicit violence, language, and/or drug use will be viewed in the class. Taught in Spanish with some readings in English. May be repeated for credit when topic varies. Not offered every year. (Writing Intensive

Course) This course is repeatable for a maximum of 9 credits. **PREREQS:** Course is designed for Spanish heritage learners and advanced students of Spanish as a second language who have completed 12 credits from SPAN 316, SPAN 317, SPAN 318, SPAN 331, SPAN 332, SPAN 333, SPAN 336, SPAN 337, SPAN 338, SPAN 339, SPAN 411, SPAN 412, SPAN 413 with a grade of B- or better.

SPAN 444. SELECTED TOPICS IN THE LITERATURE OF SPAIN (3). Representative Spanish prose, poetry, and drama, with an emphasis on the 19th and 20th centuries. Taught in Spanish. See Schedule of Classes for current term offering. May be repeated for credit when topic varies. Not offered every year. This course is repeatable for a maximum of 12 credits. **PREREQS:** Completion of 21 upper-division credits in Spanish.

SPAN 445. SELECTED TOPICS IN THE LITERATURE OF LATIN AMERICA (3). Representative prose, poetry, and drama of Spanish America and/or Brazil, with an emphasis on the mid-19th century to the present. Topics and language of instruction may vary. See Schedule of Classes for current term offering. May be repeated for credit when topic varies. Not offered every year. This course is repeatable for a maximum of 18 credits. **PREREQS:** Completion of 21 upper-division credits in Spanish.

SPAN 446. RECENT LATIN AMERICAN LITERATURE (3). Recent fiction that goes beyond Magical Realism. Discussion includes literary techniques, as well as Latin American history, politics and cultural values. Taught in Spanish. **PREREQS:** Completion of 21 upper-division credits of Spanish.

SPAN 447. MEXICAN WOMEN WRITERS (3). Fiction by contemporary Mexican women, emphasizing how the writing reflects the authors' lives, as well as Mexican history, politics and cultural values. Taught in Spanish. **PREREQS:** Completion of 21 upper-division credits of Spanish.

SPAN 448. LATIN AMERICAN GREAT WORKS (3). Major works by Latin American writers, concentrating on literary style and technique, as well as Latin American history, politics and culture. Taught in Spanish. **PREREQS:** Completion of 21 upper-division credits of Spanish.

SPAN 453. SPANISH SOCIOLINGUISTICS (3). Provides a foundation of sociolinguistic theory from which various topics can be analyzed, discussed and applied to language situations that are specific to Spanish. These include language contact, Spanish varieties, language policy, and language attitudes. All topics are presented within the context of speech communities and the external and internal variables that affect these communities. **PREREQS:** SPAN 350

SPAN 455. INTRODUCTION TO SPANISH TRANSLATION (3). Combines beginning translation theory with hands-on practice using a variety of activities from several areas of professional specialization. Includes a brief introduction to simultaneous interpretation as it is done in professional conference or broadcast media settings. Participants must be highly proficient in both English and Spanish. **PREREQS:** 12 credits of upper-division Spanish.

SPAN 456. SPANISH IN THE UNITED STATES (3). Provides a foundation for the study of Spanish in the United States. Focuses on the diverse identities of Latino/as and Spanish speakers as they define what it means to be bilingual locally, regionally, and nationally. Spanish and Spanish-English bilingualism will be studied from critical sociolinguistic, historical and political perspectives. **PREREQS:** SPAN 350

SPAN 461. FIFTH-YEAR SPANISH (3). Continued development of listening comprehension, speaking, and writing skills. Introduction to debate and platform speaking in Spanish, and to

specialized interests of students, e.g., methods and philosophies of interpretation and translation, business Spanish, creative writing. **PREREQS:** SPAN 413 or placement, and departmental approval required. SPAN 461, SPAN 462, SPAN 463 must be taken in order.

SPAN 462. FIFTH-YEAR SPANISH (3). Continued development of listening comprehension, speaking, and writing skills. Introduction to debate and platform speaking in Spanish, and to specialized interests of students, e.g., methods and philosophies of interpretation and translation, business Spanish, creative writing. **PREREQS:** SPAN 461 or placement, and departmental approval required.

SPAN 463. FIFTH-YEAR SPANISH (3). Continued development of listening comprehension, speaking, and writing skills. Introduction to debate and platform speaking in Spanish, and to specialized interests of students, e.g., methods and philosophies of interpretation and translation, business Spanish, creative writing. **PREREQS:** SPAN 462 or placement, and departmental approval required.

SPAN 470. *^ADVANCED SPANISH COORDINATED STUDIES (1-30). Interdisciplinary examination of a topic related to points of contact between Spanish- and English-speaking populations in Oregon and beyond. Includes the study of literature, culture, language skills, and a service-learning component. Constitutes a full-time course load. Taught in Spanish. (Bacc Core Course) (Writing Intensive Course) This course is repeatable for a maximum of 30 credits.

SPAN 488. HISPANIC STUDIES, HISPANIC STUDY CENTERS (1-12). Section 1: Topics, Hispanic language. Section 2: Practical work (exercises). Section 3: Topics, Hispanic arts and letters. Section 4: Topics, Hispanic society. This course is repeatable for a maximum of 12 credits.

SPAN 499. SPECIAL TOPICS (1-16). May be repeated for credit when topic varies. See Schedule of Classes for current offerings and prerequisites. Not offered every year. This course is repeatable for a maximum of 99 credits.

SPAN 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

SPAN 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

SPAN 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

SPAN 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

SPAN 506. SPECIAL PROJECTS (1-16). **PREREQS:** Departmental approval required.

SPAN 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

SPAN 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

SPAN 510. INTERNSHIP (1-15). This course is repeatable for a maximum of 15 credits.

SPAN 511. SPECIALIZED GRAMMAR OR LINGUISTICS TOPICS (3). Students develop an in-depth knowledge of various linguistic aspects of Spanish, particularly in regard to problematic grammatical structures and the development of writing proficiency. The main focus is on integrating a thorough understanding of grammatical structures into writing using selected literary works as models. Students analyze their own linguistic progress and apply this meta-knowledge to their writing. **PREREQS:** 18 credits of upper-division Spanish.

SPAN 512. ADVANCED COMPOSITION (3). Emphasis on creative writing. Students will read and discuss a series of stories with the same theme, then write their own. The subjunctive and other advanced grammar topics will be reviewed and incorporated into the writing activities. Taught in Spanish. **PREREQS:** 18 credits of upper-division Spanish or instructor approval.

SPAN 513. ADVANCED COMMUNICATION SKILLS (3). Contextualized exploration of skills outlined in the National Standards Project's "Five Cs" and in the additional area of critical consciousness with particular emphasis on language used in journalism and the mass media. This course meets 3 hours per week. **PREREQS:** 18 credits of upper-division Spanish or instructor approval.

SPAN 535. SPECIAL TOPICS IN LATIN AMERICAN CULTURE (3). Historical and contemporary aspects of the cultures of Latin America. May include material relevant to Spain and U.S. Latinos. See Schedule of Classes for current term offering. May be repeated for credit when topic varies. This course is repeatable for a maximum of 9 credits. **PREREQS:** 18 credits of upper-division Spanish or instructor approval.

SPAN 538. SELECTED TOPICS IN LUSO-HISPANIC CULTURE (3). Contemporary aspects of the cultures of Spain, Portugal, or Latin America with a cross-cultural perspective. Topics and language of instruction vary. Not offered every year. See Schedule of Classes for current term offering. May be repeated for credit when topic varies. This course is repeatable for a maximum of 9 credits. **PREREQS:** Completion of 6 credits from SPAN 331, SPAN 332, SPAN 333, SPAN 336, SPAN 337, SPAN 338.

SPAN 544. SELECTED TOPICS IN THE LITERATURE OF SPAIN (3). Representative Spanish prose, poetry, and drama, with an emphasis on the 19th and 20th centuries. Taught in Spanish. Not offered every year. See Schedule of Classes for current term offering. May be repeated for credit when topic varies. This course is repeatable for a maximum of 12 credits. **PREREQS:** Completion of 21 upper-division credits in Spanish.

SPAN 545. SELECTED TOPICS IN THE LITERATURE OF LATIN AMERICA (3). Representative prose, poetry, and drama of Spanish America and/or Brazil, with an emphasis on the mid-19th century to the present. Topics and language of instruction may vary. Not offered every year. See Schedule of Classes for current term offering. May be repeated for credit when topic varies. This course is repeatable for a maximum of 18 credits. **PREREQS:** Completion of 21 upper-division credits in Spanish.

SPAN 546. RECENT LATIN AMERICAN LITERATURE (3). Recent fiction that goes beyond Magical Realism. Discussion includes literary techniques, as well as Latin American history, politics and cultural values. Taught in Spanish. **PREREQS:** Completion of 21 upper-division credits in Spanish.

SPAN 547. MEXICAN WOMEN WRITERS (3). Fiction by contemporary Mexican women, emphasizing how the writing reflects the authors' lives, as well as Mexican history, politics and cultural values. Taught in Spanish. **PREREQS:** 21 upper-division credits of Spanish.

SPAN 548. LATIN AMERICAN GREAT WORKS (3). Major works by Latin American writers, concentrating on literary style and technique, as well as Latin American history, politics and culture. Taught in Spanish. **PREREQS:** 21 upper-division credits of Spanish.

SPAN 552. INTRODUCTION TO SPANISH SOCIOLINGUISTICS (3). Provides a foundation of sociolinguistic theory in order to analyze, discuss and apply the theory to Spanish language situations, such as language contact, Spanish

varieties, language politics, and language attitudes; all within the context of a speech community and the external and internal variables that affect it.

SPAN 553. SPANISH SOCIOLINGUISTICS (3). Provides a foundation of sociolinguistic theory from which various topics can be analyzed, discussed and applied to language situations that are specific to Spanish. These include language contact, Spanish varieties, language policy, and language attitudes. All topics are presented within the context of speech communities and the external and internal variables that affect these communities. **PREREQS:** SPAN 350

SPAN 555. INTRODUCTION TO SPANISH TRANSLATION (3). Combines beginning translation theory with hands-on practice using a variety of activities from several areas of professional specialization. Includes a brief introduction to simultaneous interpretation as it is done in professional conference or broadcast media settings. Participants must be highly proficient in both English and Spanish. **PREREQS:** 12 credits of upper-division Spanish.

SPAN 556. SPANISH IN THE UNITED STATES (3). Provides a foundation for the study of Spanish in the United States. Focuses on the diverse identities of Latino/as and Spanish speakers as they define what it means to be bilingual locally, regionally, and nationally. Spanish and Spanish-English bilingualism will be studied from critical sociolinguistic, historical and political perspectives. **PREREQS:** SPAN 350

SPAN 561. FIFTH-YEAR SPANISH (3). Continued development of listening comprehension, speaking, and writing skills. Introduction to debate and platform speaking in Spanish, and to specialized interests of students, e.g., methods and philosophies of interpretation and translation, business Spanish, creative writing. **PREREQS:** SPAN 413 or placement, and departmental authorization. SPAN 561, SPAN 562, SPAN 563 must be taken in order.

SPAN 562. FIFTH-YEAR SPANISH (3). Continued development of listening comprehension, speaking, and writing skills. Introduction to debate and platform speaking in Spanish, and to specialized interests of students, e.g., methods and philosophies of interpretation and translation, business Spanish, creative writing. **PREREQS:** SPAN 561 or placement, and departmental authorization.

SPAN 563. FIFTH-YEAR SPANISH (3). Continued development of listening comprehension, speaking, and writing skills. Introduction to debate and platform speaking in Spanish, and to specialized interests of students, e.g., methods and philosophies of interpretation and translation, business Spanish, creative writing. **PREREQS:** SPAN 562 or placement, and departmental authorization.

SPAN 569. TOPICS IN JOTERIA STUDIES (3). Creates a space for engaging with arts, activism and scholarship emerging from queer Latin@/Chican@ experiences and consciousness. Offered winter term in odd years. This course is repeatable for a maximum of 6 credits. **PREREQS:** Instructor approval.

SPAN 570. GRAD SPANISH COORDINATED STUDIES (1-15). An intensive, team-taught course in which learners engage in advanced exploration of issues of importance to Spanish-speaking communities in Oregon and facilitate the learning of undergraduate native speaker and second language students. Topics change regularly. The course addresses all communicative areas (reading, writing, speaking and listening) and includes content in the areas of literature, linguistics, culture, civic engagement, and service-learning. Successful completion of the full 15 credits with a grade of B or higher meets requirements for the graduate minor in

Contemporary Hispanic Studies. This course is repeatable for a maximum of 30 credits.

PREREQS: Completion of SPAN 599, Special Topics: "Developing a Learning Community".

SPAN 588. HISPANIC STUDIES, HISPANIC STUDY CENTERS (1-12). Section 1: Topics, Hispanic language. Section 2: Practical work (exercises). Section 3: Topics, Hispanic arts and letters. Section 4: Topics, Hispanic society.

SPAN 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 99 credits.

SPAN 808. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

■ WOMEN, GENDER AND SEXUALITY STUDIES COURSES

WGSS 199. SPECIAL STUDIES (1-3). Special topics of contemporary relevance to research of women and gender role issues. For students who seek an elementary introduction to a specific realm of women, gender, and sexuality studies. May be repeated for credit when topic varies. This course is repeatable for a maximum of 9 credits.

WGSS 223. *WOMEN: SELF AND SOCIETY (3). Multidisciplinary introduction to women, gender, and sexuality studies. Focuses on the lives and status of women in society and explores ways institutions such as family, work, media, law and religion affect different groups of women. Explores issues of gender, race, class, age, sexual orientation, size and ability. (SS) (Bacc Core Course)

WGSS 223H. *WOMEN: SELF AND SOCIETY (3). Multidisciplinary introduction to women, gender, and sexuality studies. Focuses on the lives and status of women in society and explores ways institutions such as family, work, media, law and religion affect different groups of women. Explores issues of gender, race, class, age, sexual orientation, size and ability. (SS) (Bacc Core Course) **PREREQS:** Honors College approval required.

WGSS 224. *WOMEN: PERSONAL AND SOCIAL CHANGE (3). Examines the way the questioning of traditional gender roles and their accompanying power structures can lead to change in women's personal and public lives. Explores women's heritage and contributions and focuses on issues of self-growth and social movements for change. (SS) (Bacc Core Course)

WGSS 230. *WOMEN IN THE MOVIES (3). Examines ways women are depicted in the movies and how those depictions are created by and create larger social constructions of women. Special attention is given to the intersections of race, class, sexual identity, and age with gender. (Bacc Core Course)

WGSS 230H. *WOMEN IN THE MOVIES (3). Examines ways women are depicted in the movies and how those depictions are created by and create larger social constructions of women. Special attention is given to the intersections of race, class, sexual identity, and age with gender. (Bacc Core Course) **PREREQS:** Honors College approval required.

WGSS 235. *WOMEN IN WORLD CINEMA (3). Explores constructions and practices of gender in a transnational, multi-religious, and global framework by examining a wide variety of films about women around the world. (Bacc Core Course)

WGSS 235H. *WOMEN IN WORLD CINEMA (3). Explores constructions and practices of gender in a transnational, multi-religious, and global framework by examining a wide variety of films about women around the world. (Bacc Core Course) **PREREQS:** Honors College approval required.

WGSS 240. *WOMEN IN SPORT (3). Focuses on the influence of sport, a gendered institution, on women from cultural, psychosocial, and political

perspectives, as well as how influential women can be in redefining sport to be more socially inclusive. Examines intersections of gender with age, social class, income status, race and ethnicity and politics. (Bacc Core Course)

WGSS 262. *INTRODUCTION TO QUEER STUDIES (3). Centering itself on activism and scholarship, this course examines homophobia's and transphobia's relationship with racism, colonialism, sexism, ableism, classism and other forms of oppression. Introduces key concepts, histories, and political frameworks within Lesbian, Gay, Bisexual, Transgender, and Queer political movements. (Bacc Core Course) **CROSSLISTED** as QS 262.

WGSS 262H. *INTRODUCTION TO QUEER STUDIES (3). Centering itself on activism and scholarship, this course examines homophobia's and transphobia's relationship with racism, colonialism, sexism, ableism, classism and other forms of oppression. Introduces key concepts, histories, and political frameworks within Lesbian, Gay, Bisexual, Transgender, and Queer political movements. (Bacc Core Course) **CROSSLISTED** as QS 262H. **PREREQS:** Honors College approval required.

WGSS 270. VIOLENCE AGAINST WOMEN (3). Addresses issues of domestic violence, rape, dating violence, as well as contemporary social debates about pornography and the media's impact on increasing violence against women. (SS)

WGSS 280. *WOMEN WORLDWIDE (3). Focuses on women's experiences throughout the world and examines women's issues and status cross-culturally. (Bacc Core Course)

WGSS 280H. *WOMEN WORLDWIDE (3). Focuses on women's experiences throughout the world and examines women's issues and status cross-culturally. (Bacc Core Course) **PREREQS:** Honors College approval required.

WGSS 299. TOPICS IN WOMEN, GENDER, AND SEXUALITY STUDIES (1-6). Current topics related to women, gender and sexuality. Description and analysis of different realms of knowledge about gender issues. This course is repeatable for a maximum of 12 credits.

WGSS 320. *GENDER IN TECHNOLOGY (3). Explores women's contributions and focuses in technology fields. Analyzes gendered nature of technology. Theory and practice of technologies. (Bacc Core Course)

WGSS 325. *DISNEY: GENDER, RACE, EMPIRE (3). Explores constructions of gender, race, class, sexuality, and nation in the animated films of Walt Disney; introduces concepts in film theory and criticism, and develops analyses of the politics of representation. (Bacc Core Course)

WGSS 325H. *DISNEY: GENDER, RACE, EMPIRE (3). Explores constructions of gender, race, class, sexuality, and nation in the animated films of Walt Disney; introduces concepts in film theory and criticism, and develops analyses of the politics of representation. (Bacc Core Course) **PREREQS:** Honors College approval required.

WGSS 340. *GENDER AND SCIENCE (3). Analyzes the relationship between society and science by explaining technology and science as gendered practices and bodies of knowledge. Focuses on the ways the making of women and men affect the making of science and explores the roles of women in scientific pursuits. (SS) (Bacc Core Course)

WGSS 350. *POLITICS OF MOTHERHOOD IN A GLOBAL CONTEXT (3). Introduces students to the politics of motherhood in global contexts, focusing on politics of transnational adoption; motherhood, surrogacy, and biotechnologies; effects of globalization on mothering across borders; mothering in the global welfare state; movements for reproductive justice; and transnational representations of motherhood.

(Bacc Core Course)

WGSS 360. *MEN AND MASCULINITIES IN A GLOBAL CONTEXT (3). Students will become familiar with central topics in global masculinity studies, analyze texts in diverse media, develop original arguments, and engage with issues of masculinity and representation through written and creative work. (Bacc Core Course)

WGSS 360H. *MEN AND MASCULINITIES (3). Students will become familiar with central topics in global masculinity studies, analyze texts in diverse media, develop original arguments, and engage with issues of masculinity and representation through written and creative work. (Bacc Core Course) **PREREQS:** Honors College approval required.

WGSS 364. *TRANSGENDER POLITICS (3). Addresses transgender politics--including transsexual, genderqueer, and gender non-conforming issues--through feminist and intersectional approaches by analyzing transgender theories, arts, and activism. (Bacc Core Course) **CROSSLISTED** as QS 364. **PREREQS:** Sophomore standing.

WGSS 373. APPROACHES TO SOCIAL JUSTICE (3). Students study various ways of thinking about social justice and evaluate these in case studies and current events. As a basis for the Social Justice minor, students write a research paper on the theoretical and practical aspects of a social justice issue. **CROSSLISTED** as ANTH 373, ES 373, WLC 373.

WGSS 380. *MUSLIM WOMEN (3). Examines the lives and experiences of Muslim women in Islamic communities around the world from a variety of perspectives in order to highlight issues significant for contemporary Muslim women: family, education, work, politics, health, marriage, divorce, war, and violence. (Bacc Core Course)

WGSS 380H. *MUSLIM WOMEN (3). Examines the lives and experiences of Muslim women in Islamic communities around the world from a variety of perspectives in order to highlight issues significant for contemporary Muslim women: family, education, work, politics, health, marriage, divorce, war, and violence. (Bacc Core Course) **PREREQS:** Honors College approval required.

WGSS 399. TOPICS IN WOMEN, GENDER, AND SEXUALITY STUDIES (1-6). Current topics in women, gender, and sexuality. May be repeated for credit when topic varies. This course is repeatable for a maximum of 12 credits.

WGSS 399H. TOPICS IN WOMEN, GENDER, AND SEXUALITY STUDIES (1-6). Current topics in women, gender, and sexuality. May be repeated for credit when topic varies. This course is repeatable for a maximum of 12 credits. **PREREQS:** Honors College approval required.

WGSS 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

WGSS 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

WGSS 407. SEMINAR (3). This course is repeatable for a maximum of 99 credits.

WGSS 410. INTERNSHIP (1-16). The internship experience provides the opportunity to gain experience within an off-campus private, public, or community agency or organization which has as one of its goals the improvement of the status of women in society. Students work with an on-site mentor who guides their field experience in collaboration with the internship coordinator in the WGSS program. Only 6 credits will count toward the Women, Gender, and Sexuality Studies major. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

WGSS 414. SYSTEMS OF OPPRESSION IN WOMEN'S LIVES (3). Explores the ways different

systems of oppression and discrimination impact women's lives. Examines sexism, classism, racism, and anti-Jewish oppression, as well as discrimination against queer women, older women, and those who differ in ability and appearance. (SS) (Bacc Core Course) **PREREQS:** WS 223 or WS 223H or WGSS 223 or WGSS 223H and/or instructor approval required.

WGSS 414H. *SYSTEMS OF OPPRESSION IN WOMEN'S LIVES (3). Explores the ways different systems of oppression and discrimination impact women's lives. Examines sexism, classism, racism, and anti-Jewish oppression, as well as discrimination against queer women, older women, and those who differ in ability and appearance. (SS) (Bacc Core Course) **PREREQS:** WS 223 or WS 223H or WGSS 223 or WGSS 223H and Honors College approval required or instructor approval required.

WGSS 416. THEORIES OF FEMINISM (4). Explores feminist conceptions about the nature of the world, women's reality and visions for change. Analyzes major issues raised by the women's movement and the development of feminist ideas, as well as provides a critical examination of feminist thought and different theories which comprise it. **PREREQS:** WS 223 or WS 223H or WS 224 or WGSS 223 or WGSS 223H or WGSS 224 and/or instructor approval required.

WGSS 417. FEMINIST PHILOSOPHIES (3). Diverse forms of feminist philosophy, including a variety of critiques, especially those based on race and class, with in-depth consideration of selected social issues, such as rape and pornography. **CROSSLISTED** as PHL 417/PHL 517. **PREREQS:** 6 credits of philosophy or upper-division standing.

WGSS 418. FEMINIST RESEARCH METHODS (4). Introduces feminist research methods associated with research design, analysis, and interpretation. It utilizes feminist social justice frameworks and focuses on in-depth interviewing and focus groups, oral histories, ethnography, and visual and textual analysis, as well as survey design and community-based participatory research. **PREREQS:** WGSS 414 and junior standing

WGSS 420. *HATE, RESISTANCE, AND RECONCILIATION (3). Examines hate movements, hate-related activities, and resistant acts and movements. Special attention is given to the role of gender. (Bacc Core Course)

WGSS 420H. *HATE, RESISTANCE, AND RECONCILIATION (3). Examines hate movements, hate-related activities, and resistant acts and movements. Special attention is given to the role of gender. (Bacc Core Course) **PREREQS:** Honors College approval required.

WGSS 430. WOMEN OF COLOR FEMINISMS (4). Explores the contemporary experiences of women of color, as well as the theoretical and practical frameworks of women of color feminisms. Analyses key themes in women of color feminisms, including politics of representation, multiple forms of state and interpersonal violence, intersecting forms of oppression, economic justice, reproductive justice, and strategies of resistance. **PREREQS:** WS 223 or WS 223H or WGSS 223 or WGSS 223H and WGSS 223 or WGSS 223H or WS 223 or WS 223H

WGSS 431. *QUEER OF COLOR CRITIQUES (3). "Queer of color critiques" refers to political theories and activism that emerge from LGBTQ people of color to examine the intersections between race, sexuality and gender. This course addresses these intersections through theory, history, and activism. (Bacc Core Course) **CROSSLISTED** as ES 431 and QS 431. **PREREQS:** Junior standing.

WGSS 440. *WOMEN AND NATURAL RESOURCES (3). Explores the relationship between women and natural resources. In

particular, the course examines the roles of policy, technology, culture, and management in women's use and control of natural resources. (Bacc Core Course)

WGSS 450. ECOFEMINISM (3). Focuses on the ecological and feminist principles that mediate humanity's relationship with nature. (See Schedule Comment regarding Bacc Core status.) **PREREQS:** Upper-division standing.

WGSS 460. ^WOMEN AND SEXUALITY (3). Explores the historical, theoretical, and political dimensions of female sexuality. The course also examines the basic assumptions about the meaning of female sexuality, how it has been shaped and controlled, and why women's sexuality has been/is a source of both women's liberation and subjugation. (SS) (Writing Intensive Course) **PREREQS:** WS 223 or WS 223H or WS 224 or WGSS 223 or WGSS 223H or WGSS 224 and/or instructor approval required.

WGSS 462. *QUEER THEORIES (3). Engages key themes and critical frameworks in queer theories. Topics include history of sexuality; forms of oppression including heterosexism, homophobia, and transphobia; resistance to oppression; violence against LGBTQ people; queer activism; diverse experiences of sexuality; and representations in literature, art, and popular media. (Bacc Core Course) **CROSSLISTED** as QS 462/QS 562. **PREREQS:** Junior standing.

WGSS 463. *GLOBAL SEX WORK AND TRAFFICKING (3). Examination of sex work and trafficking, cross culturally drawing upon case studies from Africa, Asia, the Americas, and Europe. It explores legal and regulatory debates, diversity of sex work-related experiences, and sex work-related social activism to uncover the gendered intersections of power and privilege from a global perspective. (Bacc Core Course) **PREREQS:** WGSS 223 or WS 223 or WGSS 224 or WS 224

WGSS 465. WOMEN, WEIGHT, AND BODY IMAGE (3). Focuses on women's increasing struggles with weight, eating disorders, and broader body image issues in contemporary society. Explores how social institutions such as media, medicine, and government contribute to weight bias and unhealthy standards for appearance. Examines weightism as a system of oppression that intersects with other systems of oppression including sexism, racism, classism, heterosexism, ableism, and ageism. **PREREQS:** WS 223 or WS 223H or WS 224 or WGSS 223 or WGSS 223H or WGSS 224

WGSS 466. *FAT STUDIES (3). Examines body weight, shape, and size as an area of human difference subject to privilege and discrimination that intersects with other systems of oppression based on gender, race, class, age, sexual orientation, and ability. Employs a multi-disciplinary approach spanning the behavioral sciences and humanities. Frames weight-based oppression as a social justice issue, exploring forms of activism used to counter weightism perpetuated throughout various societal institutions. **CROSSLISTED** as PSY 466/PSY 566 (Bacc Core Course) **PREREQS:** WS 223 or WS 223H or WS 224 or WGSS 223 or WGSS 223H or WGSS 224

WGSS 472. ^INDIGENOUS TWO-SPIRIT AND QUEER STUDIES (3). "Two-spirit" refers to North American indigenous genders outside of European male/female binaries. Two-spirit communities argue for decolonization as a central political struggle, calling all people to unlearn settler colonial gender/sexuality on Native land. This course addresses indigenous two-spirit/GLBTQ issues through theory, literature, activism, and art. **CROSSLISTED** as ES 472, QS 472. **PREREQS:** QS 262 or ES 242 or WGSS 414 or instructor permission

WGSS 473. TRANSGENDER LIVES (3). Many people in our Western cultures perceive gender as bimodal and fixed from birth. Individuals

whose identity of self does not match the individual's biological sex face significant social pressures to conform to gender norms. Students will be introduced to the biological, social and cultural contexts for transgendered individuals. **CROSSLISTED** as QS 473. **PREREQS:** WGSS 262 or QS 262 or equivalent.

WGSS 477. *QUEER/TRANS PEOPLE OF COLOR ARTS AND ACTIVISM (3). LGBTQ people of color often engage struggles for social justice through artistic movements. This course will focus on arts by LGBTQ people of color and the way these artistic movements contribute to activism that interrupts interlocking systems of oppression. (Bacc Core Course) **CROSSLISTED** as ES 477/ES 577, QS 477/QSS 577. **PREREQS:** QS 262 and QS 464

WGSS 480. *INTERNATIONAL WOMEN (3). Examines the lives and experiences of women in different parts of the world, looking at work, education, the family, the arts and social movements. Explores the comparative realities of various women's struggles for social justice and studies key definitions and theoretical assumptions relevant to the subject of global feminism. (NC) (Bacc Core Course) **PREREQS:** WS 223 or WS 223H or WS 224 or WGSS 223 or WGSS 223H or WGSS 224 and/or instructor approval.

WGSS 480H. *INTERNATIONAL WOMEN (3). Examines the lives and experiences of women in different parts of the world, looking at work, education, the family, the arts and social movements. Explores the comparative realities of various women's struggles for social justice and studies key definitions and theoretical assumptions relevant to the subject of global feminism. (NC) (Bacc Core Course) **PREREQS:** / or instructor approval. Honors College approval required.

WGSS 482. GLOBAL PERSPECTIVES ON WOMEN'S HEALTH (4). Women's health issues are examined from a global perspective in the context of a woman's life and through a feminist political lens. Central to our discussions will be an analysis of the interplay among race, class, and gender in shaping particular health care outcomes. The course stresses the potential for women's agency and autonomy with respect to improving their health and environments.

WGSS 485. CAPSTONE IN SOCIAL JUSTICE (2). Working with an advisor from the Social Justice minor, students conduct research to synthesize and extend analysis of a particular social justice issue, building on three previous papers or projects. Results are presented in a 10-15 page paper and a public poster, presentation or website. **CROSSLISTED** as ANTH 485, ES 485, WLC 485. This course is repeatable for a maximum of 4 credits. **PREREQS:** (ANTH 373 or ES 373 or WGSS 373 or WLC 373) and (ANTH 410 or ES 410 or WGSS 410 or WLC 410)

WGSS 486. GLOBAL EXPERIENCE I (1). Prepares students to participate in a short-term study abroad experience that emphasizes volunteer experiences in women's organizations and analysis from transnational feminist perspectives.

WGSS 487. GLOBAL EXPERIENCE II (1). Engages students in a short-term study abroad experience that emphasizes volunteer experiences in women's organizations and analysis from transnational feminist perspectives. **PREREQS:** WS 486 or WS 586 or WGSS 486 or WGSS 586

WGSS 488. GLOBAL EXPERIENCE III (1). Students reflect on their short-term study abroad experience by engaging in in-depth transnational feminist analysis of particular aspects of the study abroad experience. **PREREQS:** WS 486 or WS 487 or WGSS 486 or WGSS 487

WGSS 490. SELF-ESTEEM AND PERSONAL POWER (3). Explores ways to improve self-

esteem and develop personal power. Focuses on issues of self and identity, contextualizing these in the ways gender is constructed in society. (SS) **PREREQS:** Upper-division standing.

WGSS 495. *GLOBAL FEMINIST THEOLOGIES (3). Explores the connections between women's religious experiences around the world and the global problems addressed by feminist theology and spirituality. (Bacc Core Course) **PREREQS:** WS 223 or WS 223H or WS 224 or WGSS 223 or WGSS 223H or WGSS 224 and junior standing.

WGSS 495H. *GLOBAL FEMINIST THEOLOGIES (3). Explores the connections between women's religious experiences around the world and the global problems addressed by feminist theology and spirituality. (Bacc Core Course) **PREREQS:** WS 223 or WS 223H or WS 224 or WGSS 223 or WGSS 223H or WGSS 224 and junior standing. Honors College approval required.

WGSS 496. *FEMINIST THEOLOGIES IN THE UNITED STATES (3). Explores U.S.-based feminist critiques of traditional theologies and examines feminist constructions of theologies rooted in diverse human experiences. (Bacc Core Course) **PREREQS:** WS 223 or WS 223H or WS 224 or WGSS 223 or WGSS 223H or WGSS 224 and junior standing.

WGSS 496H. *FEMINIST THEOLOGIES IN THE UNITED STATES (3). Explores U.S.-based feminist critiques of traditional theologies and examines feminist constructions of theologies rooted in diverse human experiences. (Bacc Core Course) **PREREQS:** (WS 223 or WS 223H or WS 224 or WGSS 223 or WGSS 223H or WGSS 224) and junior standing and Honors College approval required.

WGSS 498. SENIOR SEMINAR (4). For graduating seniors in women, gender, and sexuality studies. Building on knowledge and experiences acquired in required and elective women, gender, and sexuality studies courses, it focuses on central questions for feminist research. In particular, the course helps students identify their approaches to women's studies scholarship and develop deeper understandings of the process of generating feminist knowledge, especially in relation to gender, race, class, sexuality, and national belonging. **PREREQS:** (WS 414 and WS 416) or (WGSS 414 and WGSS 416)

WGSS 499. TOPICS (1-6). Topics on contemporary research in women, gender, and sexuality studies. May be repeated for credit when topic varies. This course is repeatable for a maximum of 12 credits. **PREREQS:** Upper-division standing.

WGSS 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

WGSS 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

WGSS 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

WGSS 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

WGSS 510. INTERNSHIP (1-16). The internship experience provides the opportunity to gain experience within an off-campus private, public, or community agency or organization which has as one of its goals the improvement of the status of women in society. Students work with an on-site mentor who guides their field experience in collaboration with the internship coordinator in the Women, Gender, and Sexuality Studies program. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

WGSS 511. ORIENTATION AND PROFESSIONALIZATION I (1). The WGSS 511, 512, 513 sequence prepares Women,

Gender, and Sexuality Studies graduate students to succeed in their courses of study and in their chosen profession. WGSS 511 provides knowledge about Women, Gender, and Sexuality Studies as a discipline and as a course of study that helps students manage the transition to graduate school. Graded P/N.

WGSS 512. ORIENTATION AND PROFESSIONALIZATION II (1). The WGSS 511, 512, 513 sequence prepares Women, Gender, and Sexuality Studies graduate students to succeed in their courses of study and in their chosen profession. WGSS 512 guides students in the development of an intellectual life with a focus on thriving and surviving as a scholar in Women, Gender, and Sexuality Studies. Graded P/N.

WGSS 513. ORIENTATION AND PROFESSIONALIZATION III (1). The WGSS 511, 512, 513 sequence prepares Women, Gender, and Sexuality Studies graduate students to succeed in their courses of study and in their chosen profession. WGSS 513 focuses on helping students shape a future that utilizes the graduate degree in Women, Gender, and Sexuality Studies. It helps students manage the transition to life after the Women, Gender, and Sexuality Studies Master's program at OSU. Graded P/N.

WGSS 514. SYSTEMS OF OPPRESSION IN WOMEN'S LIVES (3). Explores the ways different systems of oppression and discrimination impact women's lives. Examines sexism, classism, racism, and anti-Jewish oppression, as well as discrimination against queer women, older women, and those who differ in ability and appearance. **PREREQS:** WS 223 or WS 224 or WGSS 223 or WGSS 224 or instructor approval required.

WGSS 516. THEORIES OF FEMINISM (4). Explores feminist conceptions about the nature of the world, women's reality and visions for change. Analyzes major issues raised by the women's movement and the development of feminist ideas, as well as provides a critical examination of feminist thought and different theories which comprise it. **PREREQS:** WS 223 or WS 223H or WS 224 or WGSS 223 or WGSS 223H or WGSS 224 or instructor approval required.

WGSS 517. FEMINIST PHILOSOPHIES (3). Diverse forms of feminist philosophy, including a variety of critiques, especially those based on race and class, with in-depth consideration of selected social issues, such as rape and pornography. **CROSSLISTED** as PHL 417/PHL 517. **PREREQS:** 6 credits of philosophy or upper-division standing.

WGSS 518. FEMINIST RESEARCH (4). Explores the socio-political and historical context out of which traditional research methodologies emerge and the relationship of gender to scientific pursuits. Teaches what it means to do emancipatory anti-sexist and participatory research.

WGSS 520. HATE, RESISTANCE, AND RECONCILIATION (3). Examines hate movements, hate-related activities, and resistant acts and movements. Special attention is given to the role of gender.

WGSS 521. FEMINIST LEADERSHIP AND MANAGEMENT (3). Consideration of leadership and management through a feminist lens. Through this course participants explore and develop their own leadership style and examine various contexts in which leadership can occur. This course also examines principles of effective management within organizations.

WGSS 522. GRANT WRITING & FUND DEVELOPMENT FOR FEMINIST ORGANIZATIONS (3). Provides students with the skills needed to be successful in grant-writing and fundraising for feminist organizations.

WGSS 523. COMMUNITY ORGANIZING AND COLLECTIVE ACTION (2). Addresses relationships between theory and action in feminist

context. Explores both social change activism in terms of individual and collective action strategies and social movement theory in historical and contemporary perspectives.

WGSS 524. TRANS/GENDER POLITICS (3). Addresses transgender politics—including transsexual, genderqueer, and gender non-conforming issues—through feminist and intersectional approaches by analyzing transgender theories, arts, and activism. **CROSSLISTED** as QS 524. **PREREQS:** Graduate student standing.

WGSS 525. GENDER AND TECHNOLOGY (3). Explores women's contributions and focuses in technology fields. Analyzes gendered nature of technology. Theory and practice of technologies for change and activism.

WGSS 530. WOMEN OF COLOR FEMINISMS (4). Explores the contemporary experiences of women of color, as well as the theoretical and practical frameworks of women of color feminisms. Analyzes key themes in women of color feminisms, including politics of representation, multiple forms of state and interpersonal violence, intersecting forms of oppression, economic justice, reproductive justice, and strategies of resistance. **PREREQS:** WS 223 or WS 223H or WGSS 223 or WGSS 223H or WGSS 223 or WGSS 223H or WS 223 or WS 223H

WGSS 531. QUEER OF COLOR CRITIQUES (3). "Queer of color critiques" refers to political theories and activism that emerge from LGBTQ people of color to examine the intersections between race, sexuality and gender. This course addresses these intersections through theory, history, and activism. **CROSSLISTED** as ES 531 and QS 531. **PREREQS:** Junior standing.

WGSS 535. FEMINIST TEACHING AND LEARNING (4). Focuses on the experiences and practices of the feminist classroom. Key components of the class include issues associated with the identity and development of the teacher, as well as the development of skills to help facilitate understanding, empowerment, and the personal and social agency of students.

WGSS 540. WOMEN AND NATURAL RESOURCES (3). Explores the relationship between women and natural resources. In particular, the course examines the roles of policy, technology, culture, and management in women's use and control of natural resources.

WGSS 550. ECOFEMINISM (3). Focuses on the ecological and feminist principles that mediate humanity's relationship with nature. **PREREQS:** Upper-division standing.

WGSS 560. WOMEN AND SEXUALITY (3). Explores the historical, theoretical, and political dimensions of female sexuality. The course also examines the basic assumptions about the meaning of female sexuality, how it has been shaped and controlled, and why women's sexuality has been/is a source of both women's liberation and subjugation. **PREREQS:** WS 223 or WS 223H or WS 224 or WGSS 223 or WGSS 223H or WGSS 224 or instructor approval required.

WGSS 562. QUEER THEORIES (3). Introduces key themes and critical frameworks in queer theories. Topics include histories of sexuality; forms of oppression including heterosexism, homophobia, and transphobia; resistance to oppression; violence against LGBTQ people; queer activism; diverse experiences of sexuality; and representations in literature, art, and popular media. **CROSSLISTED** as QS 462/QS 562. **PREREQS:** Junior standing.

WGSS 565. WOMEN, WEIGHT, AND BODY IMAGE (3). Focuses on women's increasing struggles with weight, eating disorders, and broader body image issues in contemporary society. Explores how social institutions such as media, medicine, and government contribute

to weight bias and unhealthy standards for appearance. Examines weightism as a system of oppression that intersects with other systems of oppression including sexism, racism, classism, heterosexism, ableism, and ageism. **PREREQS:** WS 223 or WS 223H or WS 224 or WGSS 223 or WGSS 223H or WGSS 224

WGSS 566. FAT STUDIES (4). Examines body weight, shape, and size as an area of human difference subject to privilege and discrimination that intersects with other systems of oppression based on gender, race, class, age, sexual orientation, and ability. Employs a multi-disciplinary approach spanning the behavioral sciences and humanities. Frames weight-based oppression as a social justice issue, exploring forms of activism used to counter weightism perpetuated throughout various societal institutions. **CROSSLISTED** as PSY 466/PSY 566. **PREREQS:** WS 223 or WS 223H or WS 224 or WGSS 223 or WGSS 223H or WGSS 224

WGSS 572. INDIGENOUS TWO-SPIRIT AND QUEER STUDIES (3). "Two-spirit" refers to North American indigenous genders outside of European male/female binaries. Two-spirit communities argue for decolonization as a central political struggle, calling all people to unlearn settler colonial gender/sexuality on Native land. This course addresses indigenous two-spirit/GLBTQ issues through theory, literature, activism, and art. **CROSSLISTED** as ES 572, QS 572. **PREREQS:** QS 262 or ES 242 or WGSS 414 or WGSS 514 or instructor permission

WGSS 573. TRANSGENDER LIVES (3). Many people in our Western cultures perceive gender as bimodal and fixed from birth. Individuals whose identity of self does not match the individual's biological sex face significant social pressures to conform to gender norms. Students will be introduced to the biological, social and cultural contexts for transgendered individuals. **CROSSLISTED** as QS 573. **PREREQS:** WGSS 262 or QS 262 or equivalent.

WGSS 577. QUEER/TRANS PEOPLE OF COLOR ARTS AND ACTIVISM (3). LGBTQ people of color often engage struggles for social justice through artistic movements. This course will focus on arts by LGBTQ people of color and the way these artistic movements contribute to activism that interrupts interlocking systems of oppression. **CROSSLISTED** as ES 477/ES 577, QS 477/QS 577. **PREREQS:** QS 262 and QS 464

WGSS 580. INTERNATIONAL WOMEN (3). Examines the lives and experiences of women in different parts of the world, looking at work, education, the family, the arts and social movements. Explores the comparative realities of various women's struggles for social justice and studies key definitions and theoretical assumptions relevant to the subject of global feminism. **PREREQS:** WS 223 or WS 223H or WS 224 or WGSS 223 or WGSS 223H or WGSS 224 or instructor approval required.

WGSS 582. GLOBAL PERSPECTIVES ON WOMEN'S HEALTH (4). Women's health issues are examined from a global perspective in the context of a woman's life and through a feminist political lens. Central to our discussions will be an analysis of the interplay among race, class, and gender in shaping particular health care outcomes. The course stresses the potential for women's agency and autonomy with respect to improving their health and environments.

WGSS 585. TRANSNATIONAL FEMINISMS (4). Introduces students to themes and theoretical principles of transnational feminisms, with special emphasis placed on feminist movements of the global South. We will explore colonialism, globalization, nation-building, representation, global economies, militarism, human rights, and politics of gender, race, class, sexuality, and nation.

WGSS 586. GLOBAL EXPERIENCE I (1). Prepares students to participate in a short-term study abroad experience that emphasizes

volunteer experiences in women's organizations and analysis from transnational feminist perspectives.

WGSS 587. GLOBAL EXPERIENCE II (1). Engages students in a short-term study abroad experience that emphasizes volunteer experiences in women's organizations and analysis from transnational feminist perspectives. **PREREQS:** WS 486 or WS 586 or WGSS 486 or WGSS 586

WGSS 588. GLOBAL EXPERIENCE III (1). Students reflect on their short-term study abroad experience by engaging in in-depth transnational feminist analysis of particular aspects of the study abroad experience. **PREREQS:** (WS 586 and WS 587) or (WGSS 586 and WGSS 587)

WGSS 590. SELF-ESTEEM AND PERSONAL POWER (3). Explores ways to improve self-esteem and develop personal power. Focuses on issues of self and identity, contextualizing these in the ways gender is constructed in society. **PREREQS:** Upper-division standing.

WGSS 595. GLOBAL FEMINIST THEOLOGIES (3). Explores the connections between women's religious experiences around the world and the global problems addressed by feminist theology and spirituality **PREREQS:** WS 223 or WS 224 or WGSS 223 or WGSS 224

WGSS 596. FEMINIST THEOLOGIES IN THE UNITED STATES (3). Explores U.S.-based feminist critiques of traditional theologies and examines feminist constructions of theologies rooted in diverse human experiences. **PREREQS:** WS 223 or WS 224 or WGSS 223 or WGSS 224

WGSS 599. TOPICS (1-6). Topics on contemporary research in women, gender, and sexuality. May be repeated for credit when topic varies. This course is repeatable for a maximum of 12 credits. **PREREQS:** Upper-division standing.

WGSS 603. THESIS (1-12). Graded P/N. This course is repeatable for a maximum of 999 credits.

WGSS 610. INTERNSHIP (1-6). The internship experience provides opportunities to gain experience in a private, public, or community agency or organization, which has social justice advocacy as one of its goals. Students work with an on-site mentor who guides their field experience in collaboration with the internship coordinator in the WGSS program. One feature of graduate internships is the opportunity to shadow key personnel in order to meet internship goals. Graded P/N. This course is repeatable for a maximum of 6 credits. **PREREQS:** Post-master's level standing.

WGSS 611. COLLOQUIUM (1). Provides presentations of feminist research by OSU faculty and graduate students and faculty members from other institutions. Graded P/N. This course is repeatable for a maximum of 4 credits.

■ WORLD LANGUAGES AND CULTURES COURSES

WLC 345 MULTIMODAL LITERACIES IN WORLD LANGUAGES AND CULTURES (2). Introduction to the analysis and production of multimodal literacies. Study of semiotic resources such as language and images across modalities such as film, manga, and social media. Required of all majors in World Languages and Cultures. Taught in English. **PREREQS:** CHN 213 or JPN 213 or GER 213 or FR 213 or SPAN 213 or SPAN 216 or SPAN 217 or equivalent.

WLC 360. INTERNATIONAL FILM FESTIVAL (3). Critical study of a selection of films screened at the Oregon State University's International Film Festival. Topics include acting, sound, special effects, cinematography. This course is repeatable for a maximum of 9 credits. **PREREQS:** Sophomore standing or higher.

WLC 373. APPROACHES TO SOCIAL JUSTICE (3). Students study various ways of thinking about

social justice and evaluate these in case studies and current events. As a basis for the Social Justice minor, students write a research paper on the theoretical and practical aspects of a social justice issue. **CROSSLISTED** as ANTH 373, ES 373, WGSS 373.

WLC 399. SPECIAL TOPICS (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

WLC 410. WORLD LANGUAGE INTERNSHIP (1-12). Opportunities for juniors and seniors to apply skills in world language and knowledge of world culture at selected government, industry, or business placement sites. Allows students to prepare for transition from academic to work world. Interns are supervised and evaluated by employer and faculty coordinator. See also Oregon International Internships in the catalog section on International Programs. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Completion of 90 credits with 2.75 GPA or higher; completion of the third-year language course in one foreign language with 3.00 GPA or better, with at least three terms of study in the OSU School of Language, Culture, and Society.

WLC 473. COMMUNITY-BASED LEARNING (3). A service-learning course that allows students to apply the theory and skills acquired in advanced linguistics, culture, and literature courses to specific needs of populations that speak a language taught in the department. It combines 80 hours of community-supervised fieldwork with an online academic component consisting of assigned readings, independent research, and ongoing reflective writing. Each student is expected to make significant contributions toward the completion of a deliverable product that benefits a native speaker community. Pre-advanced oral proficiency required. This course is repeatable for a maximum of 6 credits.

WLC 485. CAPSTONE IN SOCIAL JUSTICE (2). Working with an advisor from the Social Justice minor, students conduct research to synthesize and extend analysis of a particular social justice issue, building on three previous papers or projects. Results are presented in a 10-15 page paper and a public poster, presentation or website. **CROSSLISTED** as ANTH 485, ES 485, WGSS 485. This course is repeatable for a maximum of 4 credits. **PREREQS:** (ANTH 373 or ES 373 or WGSS 373 or WLC 373) and (ANTH 410 or ES 410 or WGSS 410 or WLC 410)

WLC 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

WLC 499H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

WLC 510. WORLD LANGUAGE INTERNSHIP (1-12). Opportunities for juniors and seniors to apply skills in world language and knowledge of world culture at selected government, industry, or business placement sites. Allows students to prepare for transition from the academic world to the work world. Interns are supervised and evaluated by the employer and a faculty coordinator. See also Oregon International Internships in the catalog section on International Programs. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Completion of 90 credits with 2.75 GPA or higher; completion of the third-year language course in one foreign language with 3.00 GPA or better, with at least three terms of study in the OSU School of Language, Culture, and Society.

WLC 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

SCHOOL OF PSYCHOLOGICAL SCIENCES

John Edwards, Director

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FACULTY

Associate Professors Bernieri, Edwards, Lien, Ryan, Sherman, Watkins
Assistant Professors Becker-Blease, Bogart, Kerr, Lewis, Macuga, Sanchez, Saturn

Assistant to the Director Mann

Undergraduate Major

Psychology (BA, BS, HBA, HBS)

Minor

Psychology

Graduate Minor-MAIS

Psychology

Graduate Area of Concentration
General Psychology

The psychology curriculum explores scientific approaches to a wide range of psychological phenomena. Courses meet the needs of students desiring a knowledge of psychology as part of their general education or professional background, planning to secure entry-level jobs in human services occupations, or preparing for graduate study in psychology or related fields. The department offers a major program leading to a BA or BS degree in Psychology, a minor program for undergraduate students with majors in other disciplines, and participates in the Master of Arts in Interdisciplinary Studies (MAIS) degree program offered by the Graduate School.

Graduates with bachelor degrees in psychology often find entry-level career positions in human services, law enforcement, business, education, management, sales, and also may go on to graduate study in such fields as psychology, counseling, social work, public and business administration, and law.

MASTER OF ARTS IN INTERDISCIPLINARY STUDIES

Students design their own MAIS program around three fields or areas of study, and may use specific areas of psychology for up to two of their fields. At least three courses must be in each field. Students wishing to include psychology as a specialty area in an MAIS program should

submit the following to the Graduate School:

1. Graduate Record Exam (GRE) scores for the verbal, quantitative, and analytic segments of the examination
2. Overall GPA
3. A list of psychology courses taken and the grades achieved in each
4. Transcripts of all previous university work
5. Names of two references who can be contacted by the department
6. A one- or two-page statement of the purpose for including psychology in their graduate program.

To be admitted to a psychology component of the MAIS program students must obtain written consent of a faculty member in this department who agrees to serve as the field or area advisor, as well as meeting general Graduate School entrance requirements.

PSYCHOLOGY (BA, BS, CRED, HBA, HBS)

Also available at OSU-Cascades campus and via Ecampus.

Major Requirements (65)

Core (29)

BI 102, BI 103. *General Biology (4,4) or BI 212, BI 213. *Principles of Biology (4,4)
PHL 121. *Reasoning and Writing (3) or WR 327. *Technical Writing (3)
PSY 201, PSY 202. *General Psychology (3,3)
PSY 301. Research Methods in Psychology (4)
ST 351. Introduction to Statistical Methods (4)
ST 352. Introduction to Statistical Methods (4)

Survey (16)

Select four courses from below:

PSY 330. Brain and Behavior (4) or PSY 340. Cognition (4)
PSY 350. Human Lifespan Development (4) or PSY 360. Social Psychology (4)
PSY 370. Personality (4) or PSY 381. Abnormal Psychology (4)

Plus any one additional course from above.

Advanced and Variable Courses (16)

Select four courses from below

(includes variable credit courses):

PSY 426. *Psychology of Gender (4)
PSY 432. Physiological Psychology (4)
PSY 433. Psychopharmacology (4)
PSY 437. Motivation (4)
PSY 442. Perception (4)
PSY 444. Learning and Memory (4)
PSY 448. Consciousness (4)
PSY 454. Cognitive Development (4)
PSY 456. Social Development (4)
PSY 458. Language Acquisition (4)
PSY 464. Social Cognition (4)
PSY 466. *Fat Studies (4)
PSY 482. Psychotherapy (4)
PSY 483. Developmental Psychopathology (4)
PSY 485. Behavior Modification (4)
PSY 492. Conservation Psychology (4)
PSY 494. Engineering Psychology (4)

PSY 496. Industrial and Organizational Psychology (4)

PSY 498. Health Psychology (4)

PSY 499. Special Topics (4)

Variable Credit Courses (*maximum 6 credits):

PSY 401. Research (1-16)

PSY 402. Independent Study (1-16)

PSY 403. Thesis (1-16)

PSY 405. Reading and Conference (1-16)

PSY 406. Projects (1-16)

PSY 407. Seminar (1-16)

PSY 408. Workshop (1-16)

PSY 410. Field Experience in Human Services (1-16)

Writing Intensive Course (WIC) Select one from below (4)

PSY 434. ^Brain and Behavior Methods (4)

PSY 440. ^Cognition Research (4)

PSY 460. ^Advanced Social Research Methods (4)

PSY 470. ^Psychometrics and Psychological Testing (4)

PSY 480. ^Clinical Research Methods (4)

Footnotes:

1. Students must receive a grade of C- or better in any course applied toward the major. Such courses cannot be taken with S/U grading.
 2. A maximum of 4 credits of individualized course work (PSY 401-PSY 410) can be applied to the major.
- * Baccalaureate Core Course
^ Writing Intensive Courses (WIC)

PSYCHOLOGY MINOR

Also available via Ecampus.

Core (6)

PSY 201, PSY 202. *General Psychology (3,3)

Survey (8)

Select two of the following courses (8):

PSY 330. Brain and Behavior (4)

PSY 340. Cognition (4)

PSY 350. Human Lifespan Development (4)

PSY 360. Social Psychology (4)

PSY 370. Personality (4)

PSY 381. Abnormal Psychology (4)

Advanced/Variable Courses (16)

- a. At least two must be at the 400 level
- b. No more than 4 credits of individualized research and field experience may be applied to the minor.

Total=30

Note: Students should consult their major advisors to see if specific courses are required for their major. Students must receive a grade of C- or better in any course applied toward the minor. Such courses cannot be taken with S/U grading.

PSYCHOLOGY GRADUATE MINOR

Graduate Areas of Concentration
General psychology

Graduate work in the School of Psychological Sciences may apply to the Master of Arts in Interdisciplinary Studies degree or to minors in other advanced degree programs.

■ PSYCHOLOGY COURSES

PSY 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PSY 201. *GENERAL PSYCHOLOGY (3). Scientific study of behavior and experience. Biological bases of behavior; sensation and perception; conditioning, learning and memory; thinking, problem solving, language, and consciousness; cognitive, personal and social development. (SS) (Bacc Core Course)

PSY 202. *GENERAL PSYCHOLOGY (3). Motivation and emotion; personality; measurement of human differences; adjustment, psychopathology and psychotherapy; attitudes and social behavior. (SS) (Bacc Core Course)

PSY 301. RESEARCH METHODS IN PSYCHOLOGY (4). Study of scientific methodology in psychology, including experimental and observational techniques. Topics include problem identification and hypothesis formation, research design, application of statistics, collection and interpretation of data, computer usage, and research report writing. Lec/lab. **PREREQS:** (PSY 201 and PSY 202 and (ST 211 or ST 351 or ST 351H))

PSY 330. BRAIN AND BEHAVIOR (4). Introduction to the relationships of the structure and functioning of the human brain to behavior. Information from neuroanatomy, neurochemistry, neurosurgery and neurology is combined with psychological research on both normal and abnormal human behavior. (SS) **PREREQS:** PSY 201 and PSY 202

PSY 340. COGNITION (4). Theories, research and applications concerning cognition. Topics include perception, attention, memory, learning, thinking and language. (SS) **PREREQS:** PSY 201 and PSY 202

PSY 350. HUMAN LIFESPAN DEVELOPMENT (4). An introduction to physical, social, cognitive and linguistic development with an emphasis on theory and methodology. (SS) **PREREQS:** (PSY 201 and PSY 202)

PSY 360. SOCIAL PSYCHOLOGY (4). The study of behavior and experience in a social context. Topics include person perception, attribution, attraction and love, attitudes and attitude change, aggression, social influence and group dynamics. Applications of social psychological principles to other fields, e.g. law, health care, etc. (SS) **PREREQS:** PSY 202 and PSY 201

PSY 360H. SOCIAL PSYCHOLOGY (4). The study of behavior and experience in a social context. Topics include persons perception, attribution, attraction and love, attitudes and attitude change, aggression and social influence and group dynamics. Applications of social psychological principles to other fields, e.g., law, health care, etc. (SS) **PREREQS:** PSY 202 and PSY 201. Honors College approval required.

PSY 370. PERSONALITY (4). An overview of major theories of personality is followed by an introduction to personality testing and research. (SS) **PREREQS:** (PSY 201 and PSY 202)

PSY 381. ABNORMAL PSYCHOLOGY (4). Survey of various forms of psychological disorders; theories regarding etiology and treatment. Special emphasis on research approaches to such disorders. **PREREQS:** (PSY 201 and PSY 202)

PSY 381H. ABNORMAL PSYCHOLOGY (4). Survey of various forms of psychological disorders; theories regarding etiology and treatment. Special emphasis on research approaches to such disorders. **PREREQS:** (PSY 201 and PSY 202) and Honors College approval required.

PSY 399. SPECIAL TOPICS (1-6). This course is repeatable for a maximum of 6 credits.

PSY 399H. SPECIAL TOPICS (1-6). This

course is repeatable for a maximum of 6 credits. **PREREQS:** Honors College approval required.

PSY 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PSY 402. INDEPENDENT STUDY (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PSY 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PSY 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PSY 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PSY 407. SEMINAR (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PSY 408. WORKSHOP (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PSY 410. FIELD EXPERIENCE IN HUMAN SERVICES (1-16). Practicum/internship placement in community human service agencies. Includes regular on-site supervision, relevant readings, projects, and faculty site visits. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PSY 426. *PSYCHOLOGY OF GENDER (4). Survey of theories, life cycles and contemporary problems of women and men in a social context. Scientific examination of gender related to psychological functioning and behavior. Topics can include psychological research on human similarities and differences in gender attitudes, relationships, sexuality, violence, employment, and mental health. (Bacc Core Course) **PREREQS:** PSY 202

PSY 432. PHYSIOLOGICAL PSYCHOLOGY (4). Basic vertebrate neurophysiology and neuroanatomy in relation to behavior. Neural and hormonal correlates of sensation, learning, memory and motivation. **PREREQS:** PSY 330 and /or equivalent biological science background.

PSY 433. PSYCHOPHARMACOLOGY (4). Drug-brain-behavior interactions. Psychoactive drugs and their relationships to normal and abnormal behavior in humans. **PREREQS:** Upper-division standing. Biological science background helpful.

PSY 434. ^BRAIN AND BEHAVIOR METHODS (4). Methodology primarily in the area of neuropsychological research. Topics include the finding and interpretation of background literature, critical evaluation of research, hypothesis formulation, experimental design, data interpretation, reporting of results and methods, and weaving a conclusion and review article. (Writing Intensive Course) **PREREQS:** (PSY 301 and PSY 330)

PSY 437. MOTIVATION (4). Biological, learning, and cognitive approaches to human and animal motivation. Topics include evolution, homeostasis, drive, arousal, incentive motivation, achievement motivation, and social motivation. **PREREQS:** (PSY 330 or PSY 340) and PSY 301

PSY 440. ^COGNITION RESEARCH (4). Advanced scientific methodology primarily in the areas of attention, learning, memory, and thinking. Students will design their own research projects, collect and analyze data, and write a professional report. (Writing Intensive Course) **PREREQS:** (PSY 301 and PSY 340)

PSY 442. PERCEPTION (4). Fundamental concepts of animal and human sensation and perception, with emphasis on audition and vision.

Applications of psychophysical methods to research in all sensory modalities. Includes review workshops on basic mathematical, physical and physiological concepts necessary to interpret research in this field. **PREREQS:** (PSY 330 or PSY 340) and PSY 301

PSY 444. LEARNING AND MEMORY (4). Experimental and theoretical work on learning, conditioning, and memory in animals and humans. **PREREQS:** PSY 340 and PSY 301

PSY 448. CONSCIOUSNESS (4). Psychological, phenomenological, and physiological approaches to the content and processes of subjective awareness. Topics include philosophical issues, cortical and reticular neurophysiology, sleeping and dreaming, selective attention, imagery, and self-awareness. **PREREQS:** PSY 340 and PSY 301

PSY 454. COGNITIVE DEVELOPMENT (4). Discusses intellectual development from infancy to adulthood. Topics include the origin of thinking, the development of perception, attention, memory, problem solving, language, academic skills, and social cognition. Piaget, Vygotsky, and information processing approaches will be discussed. **PREREQS:** PSY 350

PSY 456. SOCIAL DEVELOPMENT (4). Covers theories and research concerning human social development. Topics include theories of socialization; the development of social relationships; the self-concept; emotion; sex roles; social cognition; pro-social behavior; morality; self-control; and aggression. **PREREQS:** PSY 350

PSY 458. LANGUAGE ACQUISITION (4). Psychological processes involved in the acquisition and use of language throughout childhood. Biological, cognitive, and social influences on language will be discussed, as well as personal uses of language, such as language in thought and reading. **PREREQS:** PSY 350

PSY 460. ^ADVANCED SOCIAL RESEARCH METHODS (4). Advanced experimental research methods in the social sciences. Issues in psychological construct operationalization, experimental design, data collection, analysis, and report writing will be emphasized. (Writing Intensive Course) **PREREQS:** (PSY 301 and PSY 360)

PSY 464. SOCIAL COGNITION (4). Research and theory concerning cognitive structures and processes underlying social judgment and social behavior. Topics include attribution theory, social inference, person memory, schema-based information processing. **PREREQS:** PSY 360

PSY 466. *FAT STUDIES (4). Examines body weight, shape, and size as an area of human difference subject to privilege and discrimination that intersects with other systems of oppression based on gender, race, class, age, sexual orientation, and ability. Employs a multi-disciplinary approach spanning the behavioral sciences and humanities. Frames weight-based oppression as a social justice issue, exploring forms of activism used to counter weightism perpetuated throughout various societal institutions. CROSSLISTED as WGSS 466/WGSS 566. (Bacc Core Course) **PREREQS:** WS 223 or WS 223H or WGSS 223 or WGSS 223H or WS 224 or WGSS 224

PSY 468. THE PSYCHOLOGY OF CLOSE RELATIONSHIPS (4). Explores the research and theory on the development, maintenance, and dissolution of human relationships. The course will examine various directions to the study of interpersonal relationships, including attachment, evolutionary-biological, cognition, and interdependence. Topics will also include physical attraction, love, friendship, communication, trust, jealousy, and several issues that are specific to troubled dyadic relations. **PREREQS:** PSY 360

PSY 470. ^PSYCHOMETRICS AND PSYCHOLOGICAL TESTING (4). An introduction to psychological measurement is provided with

emphasis on the notions of reliability and validity; advanced correlation techniques are introduced. These methods are applied to contemporary tests of personality, aptitude, and achievement. (Writing Intensive Course) **PREREQS:** (PSY 301 and (PSY 340 or PSY 370 or PSY 380 or PSY 381 or PSY 481))

PSY 480. ^CLINICAL RESEARCH METHODS (4). Advanced research methods used in clinical psychology research. Design of studies, assessment, data collection, and interpretation will be discussed. The clinical content area focused on will vary. (Writing Intensive Course) **PREREQS:** (PSY 301 and (PSY 380 or PSY 381 or PSY 481))

PSY 482. PSYCHOTHERAPY (4). Survey of the theory, techniques and research on the major contemporary systems of psychotherapy. **PREREQS:** (PSY 370 or PSY 380 or PSY 381 or PSY 481)

PSY 483. DEVELOPMENTAL PSYCHOPATHOLOGY (4). Developmental perspective on child and adolescent psychological disorders including causal factors, associated features, and research-supported interventions. **PREREQS:** (PSY 350 or PSY 381 or PSY 481) and /or equivalent.

PSY 485. BEHAVIOR MODIFICATION (4). Review of basics of operant and classical conditioning. Research on behavior modification and behavior therapy with both normal and abnormal animals, human adults, and children. Application areas include behavior problems, handicaps, eating disorders, time management, self control stress management, contingency contracts, and cognitive therapies. **PREREQS:** (PSY 350 or PSY 380 or PSY 381 or PSY 481) and /or equivalent work in family life or education.

PSY 492. CONSERVATION PSYCHOLOGY (4). Explores connections between the study of human behavior and the achievement of conservation goals. Understanding how people think about and interact with nature is crucial for promoting environmental sustainability and human well-being. Students will examine theory and research on human cognitive, emotional, and behavioral responses to nature. **PREREQS:** PSY 201 and PSY 202

PSY 494. ENGINEERING PSYCHOLOGY (4). Survey human capabilities and limitations in human-machine interaction, including vision, memory, attention, motor control, and human error. Emphasis on theory and implications for system designs. **PREREQS:** (PSY 301 and PSY 340)

PSY 496. INDUSTRIAL AND ORGANIZATIONAL PSYCHOLOGY (4). Survey of psychological research and theory relevant to organizations, industry, and other work settings. Topics include training, employee selection, performance evaluation, work attitudes, and motivation. **PREREQS:** (PSY 360 or PSY 370)

PSY 498. HEALTH PSYCHOLOGY (4). Psychological factors in the maintenance of good health and in the prevention of, treatment of, and recovery from illness: Behavioral contributions to illness, life-style risk factors, stress and the immune system, psychological response to symptoms and care-givers, health habits and self-care, management of pain and chronic illness, disability and terminal illness. **PREREQS:** (PSY 330 or PSY 340 or PSY 350 or PSY 360 or PSY 370 or PSY 381 or PSY 481)

PSY 499. SPECIAL TOPICS (1-16). Newly emerging or specialized topics that can only be offered occasionally or for particular purposes. Each offering will be structured with a syllabus. This course is repeatable for a maximum of 30 credits. **PREREQS:** To be determined for each offering.

PSY 499H. SPECIAL TOPICS (1-16). Newly emerging or specialized topics that can only be offered occasionally or for particular purposes. Each offering will be structured with a syllabus.

PREREQS: To be determined for each offering and Honors College approval.

PSY 501. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PSY 502. INDEPENDENT STUDY (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PSY 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

PSY 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PSY 506. PROJECTS (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PSY 507. SEMINAR (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PSY 508. WORKSHOP (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PSY 510. FIELD EXPERIENCE IN HUMAN SERVICES (3-15). Practicum/internship placement in community human service agencies. Includes regular on-site supervision, relevant readings, projects, and faculty site visits. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PSY 526. PSYCHOLOGY OF GENDER (4). Survey of theories, life cycles and contemporary problems of women and men in a social context. Scientific examination of gender related to psychological functioning and behavior. Topics can include psychological research on human similarities and differences in gender attitudes, relationships, sexuality, violence, employment, and mental health. **PREREQS:** PSY 202

PSY 532. PHYSIOLOGICAL PSYCHOLOGY (4). Basic vertebrate neurophysiology and neuroanatomy in relation to behavior. Neural and hormonal correlates of sensation, learning, memory and motivation. **PREREQS:** PSY 330 or equivalent biological science background.

PSY 533. PSYCHOPHARMACOLOGY (4). Drug-brain-behavior interactions. Psychoactive drugs and their relationships to normal and abnormal behavior in humans. **PREREQS:** Graduate standing. Biological science background helpful.

PSY 534. BRAIN AND BEHAVIOR METHODS (4). Methodology primarily in the area of neuropsychological research. Topics include the finding and interpretation of background literature, critical evaluation of research, hypothesis formulation, experimental design, data interpretation, reporting of results and methods, and weaving a conclusion and review article. **PREREQS:** PSY 301 and PSY 330

PSY 537. MOTIVATION (4). Biological, learning, and cognitive approaches to human and animal motivation. Topics include evolution, homeostasis, drive, arousal, incentive motivation, achievement motivation, and social motivation. **PREREQS:** PSY 301 and (PSY 330 or PSY 340)

PSY 540. COGNITION RESEARCH (4). Advanced scientific methodology primarily in the areas of attention, learning, memory, and thinking. Students will design their own research projects, collect and analyze data, and write a professional report. **PREREQS:** PSY 301 and PSY 340

PSY 542. PERCEPTION (4). Fundamental concepts of animal and human sensation and perception, with emphasis on audition and vision. Applications of psychophysical methods to research in all sensory modalities. Includes review workshops on basic mathematical, physical and

physiological concepts necessary to interpret research in this field. **PREREQS:** PSY 301 and (PSY 330 or PSY 340)

PSY 544. LEARNING AND MEMORY (4). Experimental and theoretical work on learning, conditioning, and memory in animals and humans. **PREREQS:** PSY 301 and PSY 340

PSY 548. CONSCIOUSNESS (4). Psychological, phenomenological, and physiological approaches to the content and processes of subjective awareness. Topics include philosophical issues, cortical and reticular neurophysiology, sleeping and dreaming, selective attention, imagery, and self-awareness. **PREREQS:** PSY 301 and PSY 340

PSY 554. COGNITIVE DEVELOPMENT (4). Discusses intellectual development from infancy to adulthood. Topics include the origin of thinking, the development of perception, attention, memory, problem solving, language, academic skills, and social cognition. Piaget, Vygotsky, and information processing approaches will be discussed. **PREREQS:** PSY 350 and graduate standing.

PSY 556. SOCIAL DEVELOPMENT (4). Covers theories and research concerning human social development. Topics include theories of socialization; the development of social relationships; the self-concept; emotion; sex roles; social cognition; pro-social behavior; morality; self-control; and aggression. **PREREQS:** PSY 350 and graduate standing.

PSY 558. LANGUAGE ACQUISITION (4). Psychological processes involved in the acquisition and use of language throughout childhood. Biological, cognitive, and social influences on language will be discussed, as well as personal uses of language, such as language in thought and reading. **PREREQS:** PSY 350

PSY 560. ADVANCED SOCIAL RESEARCH METHODS (4). Advanced experimental research methods in the social sciences. Issues in psychological construct operationalization, experimental design, data collection, analysis, and report writing will be emphasized. **PREREQS:** PSY 301 and PSY 360

PSY 564. SOCIAL COGNITION (4). Research and theory concerning cognitive structures and processes underlying social judgment and social behavior. Topics include attribution theory, social inference, person memory, schema-based information processing. **PREREQS:** PSY 360 and graduate standing.

PSY 566. FAT STUDIES (4). Examines body weight, shape, and size as an area of human difference subject to privilege and discrimination that intersects with other systems of oppression based on gender, race, class, age, sexual orientation, and ability. Employs a multi-disciplinary approach spanning the behavioral sciences and humanities. Frames weight-based oppression as a social justice issue, exploring forms of activism used to counter weightism perpetuated throughout various societal institutions. **CROSSLISTED** as WGSS 466/WGSS 566 **PREREQS:** WS 223 or WS 223H or WGSS 223 or WGSS 223H or WS 224 or WGSS 224

PSY 570. PSYCHOMETRICS AND PSYCHOLOGICAL TESTING (4). An introduction to psychological measurement is provided, with emphasis on the notions of reliability and validity; advanced correlational techniques are introduced. These methods are applied to contemporary tests of personality, aptitude, and achievement. **PREREQS:** PSY 301 and (PSY 340 or PSY 370)

PSY 580. CLINICAL RESEARCH METHODS (4). Advanced research methods used in clinical psychology research. Design of studies, assessment, data collection, and interpretation will be discussed. The clinical content area focused on will vary. **PREREQS:** PSY 301 and (PSY 380 or PSY 381 or PSY 481)

PSY 582. PSYCHOTHERAPY (4). Survey of the theory, techniques and research on the major contemporary systems of psychotherapy. **PREREQS:** PSY 370 or PSY 381

PSY 583. DEVELOPMENTAL PSYCHOPATHOLOGY (4). Developmental perspective on child and adolescent psychological disorders including causal factors, associated features, and research-supported interventions. **PREREQS:** PSY 350 or PSY 381 or PSY 481

PSY 585. BEHAVIOR MODIFICATION (4). Review of basics of operant and classical conditioning. Research on behavior modification and behavior therapy with both normal and abnormal animals, human adults, and children. Application areas include: behavior problems, handicaps, eating disorders, time management, self control, stress management, contingency contracts, and cognitive therapies. **PREREQS:** PSY 350 or equivalent work in family life or education.

PSY 592. CONSERVATION PSYCHOLOGY (4). Explores connections between the study of human behavior and the achievement of conservation goals. Understanding how people think about and interact with nature is crucial for promoting environmental sustainability and human well-being. Students will examine theory and research on human cognitive, emotional, and behavioral responses to nature. **PREREQS:** PSY 201 and PSY 202

PSY 594. ENGINEERING PSYCHOLOGY (4). Survey human capabilities and limitations in human-machine interaction, including vision, memory, attention, motor control, and human error. Emphasis on theory and implications for system designs. **PREREQS:** (PSY 301 and PSY 340)

PSY 596. INDUSTRIAL AND ORGANIZATIONAL PSYCHOLOGY (4). Survey of psychological research and theory relevant to organizations, industry, and other work settings. Topics include training, employee selection, performance evaluation, work attitudes, and motivation. **PREREQS:** PSY 360 and PSY 370

PSY 598. HEALTH PSYCHOLOGY (4). Psychological factors in the maintenance of good health and in the prevention of, treatment of, and recovery from illness: Behavioral contributions to illness, life-style risk factors, stress and the immune system, psychological response to symptoms and care-givers, health habits and self-care, management of pain and chronic illness, disability and terminal illness. **PREREQS:** 300-level course in psychology.

PSY 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 99 credits. **PREREQS:** To be determined for each offering.

SCHOOL OF PUBLIC POLICY

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Policy is about the way we make decisions in both private and public contexts. Faculty and students in the School of Public Policy are interested in a wide variety of decision contexts and are particularly interested in advancing the social and policy-related dimensions of OSU's three areas of distinction: sustainable ecosystems, health and wellness, and economic growth and progress. The School of Public Policy offers undergraduate majors and minors in economics, political science, and sociology, as well as the Master in Public Policy (MPP) degree, PhD in Public Policy, and graduate minors in political science and sociology. School faculty members also participate

in the Master of Arts in Interdisciplinary Studies (MAIS) program.

FACULTY

Professors Conway, M. Edwards, Färe, Foster, Gallagher, Lach, Plaza, Ray, Steel, C. Tremblay, V. Tremblay, Warner, Weber
Associate Professors Akins, Cramer, Emerson, Hammer, Henderson, Inderbitzen, Li, Loges, Meng, Ortiz, Solberg, Valls
Assistant Professors Baker, Below, Bernell, Boudet, Burkhardt, Eisenhuth, Hurst, Johnston, Jones, Pugatch, Schroeder
Instructors Andersen, Clark, Crawford, Hellman, Jennings, C. Soltau Nelson, M. Nelson, Stanley, Worters
Professor Emeriti Clinton, Cordray, Grosskopf, Lunch, Sahr

Undergraduate Majors

Economics (BA, BS, HBA, HBS)

Options

Law, Economics and Policy
Managerial Economics
Mathematical Economics

Political Science (BA, BS, HBA, HBS)

Options

Environmental Politics and Policy
International Affairs
Law, Politics and Society

Sociology (BA, BS, HBA, HBS)

Options

Crime and Justice
Environmental and Natural Resource Sociology

Social Science (BA, BS)

(OSU-Cascades only)

Option

Community Development and Leadership

Minors

Asian Studies
Economics
Political Science
Sociology

Graduate Major

Public Policy (MPP, PhD)

Graduate Areas of Concentration

Energy Policy
Environmental Policy
International Policy
Law, Crime, and Policy
Rural Policy
Science and Technology Policy
Social Policy

Graduate Minors

Political Science
Sociology

Master of Arts in Interdisciplinary Studies

(See http://oregonstate.edu/dept/grad_school/mais.html)

UNDERGRADUATE PROGRAMS

The School of Public Policy offers undergraduate major and minor programs in economics, political science, and sociology.

ECONOMICS PROGRAM

The economics program is an excellent choice for students interested in:

- Law school or graduate programs in business, economics, public administration or other social sciences.
- Careers in business or public management.
- Becoming wiser consumers and better informed citizens.

The study of economics provides a framework for logical thought that can be used to address a wide variety of practical problems and situations. It can provide uncommon insights into society itself. Indeed, people holding degrees in economics are increasingly sought for positions of responsibility and authority in government, business, and industry. The economics major is useful preparation for various careers and for graduate study in many fields, primarily because it does not lead simply to the accumulation of facts but rather develops analytical skills that can be used in many ways.

POLITICAL SCIENCE PROGRAM

Graduates of the political science program pursue:

- Careers in all levels of government, foreign service, national and international nongovernmental organizations, journalism, business or public management.
- Law school or graduate programs in political science, public administration, public policy, business, or other social sciences.
- Elected office.

Students can focus their interests in different subfields, including American politics, public law, political theory, international relations, and comparative politics (for example, Asia, Latin America, Western Europe, Russia). Political science majors are encouraged to incorporate a minor in other social science fields such as economics, psychology, or sociology, or in a field of interest related to their specialization in political science. For example, students with interest in international relations or comparative politics may choose to minor in a language or in history, emphasizing a specific part of the world. Political science majors also are encouraged to consider the International Degree and Global Graduates Internship programs.

SOCIOLOGY PROGRAM

Graduates of the sociology program pursue:

- Careers in community development,

criminal justice, business, public administration, social services, recreation, and research and teaching.

- Graduate programs in sociology, criminology, public policy, social services, human resources, law, social work and other social sciences.

Sociology is the study of human social behavior and sociologists examine interactions within and between groups and resulting social institutions. The undergraduate program in sociology provides a general analysis and broad understanding of human societies and culture for persons in all fields. Selecting courses around a topic or theme of interest adds meaning to one's education and strengthens the base of understanding from which one can pursue a career or further education. Two options are currently available for those interested — Crime and Justice, and Environmental and Natural Resource Sociology — although students can shape a custom theme such as international development or social policy.

GRADUATE PROGRAMS

The School of Public Policy offers a Master in Public Policy degree, PhD in Public Policy, and graduate minors in Political Science and Sociology, and courses applicable toward the graduate degree in Applied Economics. Faculty members also participate in the Master of Arts in Interdisciplinary Studies (MAIS) program.

MASTER IN PUBLIC POLICY (MPP)

Graduates of the MPP program:

- Are employed at all levels of government as policy analysts, project managers, and managers.
- Work in national and international nongovernmental organizations like the United Nations.
- Pursue further graduate training in law, public administration, public affairs, public policy, and other social science disciplines.

Policy students at OSU focus their studies around environmental and natural resource policy, international policy, social policy, and rural policy, working with strong researchers around campus. Internships with agencies and organizations give policy students real world experience and networks to enhance their classroom education.

PHD IN PUBLIC POLICY

The PhD in Public Policy prepares students for academic or nonacademic research careers in the public, private, and nongovernmental sectors. The Public Policy Graduate Program accepts students with backgrounds in related academic disciplines. Like the MPP, the PhD program offers concentrations in energy policy; international policy; law, crime,

and policy; rural policy; science and technology policy; and/or social policy.

MASTER OF ARTS IN INTERDISCIPLINARY STUDIES (MAIS)

The MAIS program is designed to meet the particular needs and interests of individual students and features collaborative work in any two or three pertinent departments or schools. Political science and sociology faculty members may serve as one or two of the minor fields of concentration.

GRADUATE MINORS**POLITICAL SCIENCE**

Master's or PhD students interested in adding a Political Science minor should follow the guidelines within their major program in declaring a minor. All students declaring political science as a graduate minor must contact the program coordinator prior to doing so. See the Political Science website <http://oregonstate.edu/cla/polisci/graduate-programs> for a listing of requirements for the minor concentration.

SOCIOLOGY

Master's or PhD students interested in adding a Sociology minor should follow the guidelines within their major program in declaring a minor. The minimum number of credits for sociology is 15 or higher if required by the major. All students declaring sociology as a graduate minor must contact the program coordinator prior to doing so. See the Sociology website <http://oregonstate.edu/cla/sociology/graduate-minor> for a listing of requirements for the minor concentration.

UNDERGRADUATE MAJORS WITH OPTIONS**ECONOMICS (BA, BS, CRED, HBA, HBS)**

Businesses want employees who can think, communicate orally, write, and solve problems and who are comfortable with quantitative analysis. The traditional economics major perfectly prepares students to meet these demands.

Economics Core Curriculum (32)

ECON 201. *Introduction to Microeconomics (4)
 ECON 202. *Introduction to Macroeconomics (4)
 ECON 411. Microeconomic Theory (4) or ECON 311. Intermediate Microeconomic Theory I (4)
 ECON 415. Macroeconomic Theory (4) or ECON 315. Intermediate Macroeconomic Theory I (4)
 ECON 423. Econometrics I (4)
 ECON 427. Econometrics II (4) or ECON 424. Introduction to Econometrics (4)

ECON 428. ^Introduction to Economic Research (4)
or ECON 439. ^Public Policy Analysis (4)
or ECON 463. ^Efficiency and Productivity Analysis (4)
MTH 241. *Calculus for Management and Social Science (4)
or MTH 251. *Differential Calculus (4)

Additional Requirements (19)

19 credits of additional approved economics courses at the 300 level or above, at least 4 credits of which must be in courses numbered 411 or higher.

Total credits=51

All students must receive a grade of C (2.00) or better in all upper-division required courses and must maintain an overall grade-point average (GPA) of 2.00 in all economics courses. Majors may not select S/U grading in any economics classes. No more than 4 credits from ECON 402, ECON 403, ECON 405, and ECON 410 may be used to satisfy major requirements.

A recommended program of study for economics majors:

Freshman Year or Sophomore Year

ECON 201. *Introduction to Microeconomics (4)
ECON 202. *Introduction to Macroeconomics (4)
MTH 241. *Calculus for Management and Social Science (4)
or MTH 251. *Differential Calculus (4)

Sophomore or Junior Year

ECON 411. Microeconomic Theory (4)
or ECON 311. Intermediate Microeconomic Theory I (4)
ECON 415. Macroeconomic Theory (4)
or ECON 315. Intermediate Macroeconomic Theory I (4)
ECON 423. Econometrics I (4)
ECON 427. Econometrics II (4)
or ECON 424. Introduction to Econometrics (4)
Economics electives

Junior or Senior Year

ECON 428. ^Introduction to Economic Research (4)
or ECON 439. ^Public Policy Analysis (4)
or ECON 463. ^Efficiency and Productivity Analysis (4)
Economics electives

Footnotes:

* Baccalaureate Core Course
^ Writing Intensive Course (WIC)

OPTIONS

LAW, ECONOMICS AND POLICY OPTION

The Law, Economics and Policy option is an interdisciplinary program drawing from political science and philosophy courses as well as economics. This option serves students interested in public service or advanced study in law or public policy.

Economics Core Curriculum (28)

ECON 201. *Introduction to Microeconomics (4)
ECON 202. *Introduction to Macroeconomics (4)
ECON 311. Intermediate Microeconomic Theory (4)
or ECON 411. Microeconomic Theory (4)
ECON 315. Intermediate Macroeconomic Theory (4)
or ECON 415. Advanced Macroeconomic Theory (4)
ECON 424. Introduction to Econometrics (4)
or ECON 427. Econometrics II (4)
ECON 428. ^Introduction to Economic Research (4)
or ECON 439. ^Public Policy Analysis (4)
or ECON 463. ^Efficiency and Productivity Analysis (4)
ST 351. Introduction to Statistical Methods (4)
or ECON 423. Econometrics I (4)

Law, Economics and Policy Option Additional Requirements (23)

A. Four of the following courses, at least two must be from economics:

ECON 414. Political and Behavioral Economics (4)
ECON 435. The Public Economy (4)
ECON 439. ^Public Policy Analysis (4)
ECON 461. Law, Economics, and Regulation (4)
ECON 480. Labor Economics (4)
PHL 321. Deductive Logic (4)
PS 321. American Constitutional Law (4)
PS 326. Judicial Process and Politics (4)
PS 371. Public Policy Problems (4)
PS 479. Topics in Public Policy and Public Administration (4)

B. Two additional courses in economics at the 300- or 400-level

Total credits=51

All students must receive a grade of C (2.00) or better in all upper-division required courses and must maintain an overall grade-point average (GPA) of 2.00 in all courses taken for the option. Majors may not select S/U grading in any economics classes. No more than 4 credits from ECON 402, ECON 403, ECON 405, and ECON 410 may be used to satisfy major requirements.

MANAGERIAL ECONOMICS OPTION

The Managerial Economics option emphasizes applications of economics to the problems of management for students planning to enter business careers upon graduation.

Economics Core Curriculum (32)

ECON 201. *Introduction to Microeconomics (4)
ECON 202. *Introduction to Macroeconomics (4)
ECON 311. Intermediate Microeconomic Theory (4)
or ECON 411. Advanced Microeconomic Theory (4)
ECON 315. Intermediate Macroeconomic Theory (4)

or ECON 415. Advanced Macroeconomic Theory (4)
ECON 424. Introduction to Econometrics (4)
or ECON 427. Econometrics II (4)
ECON 428. ^Introduction to Economic Research (4)
or ECON 439. ^Public Policy Analysis (4)
or ECON 463. ^Efficiency and Productivity Analysis (4)
MTH 241. *Calculus for Management and Social Science (4)
or MTH 251. *Differential Calculus (4)
ST 351. Introduction to Statistical Methods (4)
or ECON 423. Econometrics I (4)

Additional Requirements (19–23)

ECON 462. Managerial Economics (4)
or ECON 460. Industrial Organization Theory and Policy (4)
BA 215. Fundamentals of Accounting (4)
or BA 211. Financial Accounting (4) and BA 213. Managerial Economics (4)
BA 360. Introduction to Financial Management (4)

Plus any two courses below (8):

BA 351. Managing Organizations (4)
BA 357. Operations Management (4)
BA 390. Marketing (4)
ECON 330. Money and Banking (4)
ECON 340. International Economics (4)
ECON 460. Industrial Organization (4)
[Cannot be used here if used above.]
ECON 463. ^Efficiency and Productivity Analysis (4)[Cannot be used here if used for WIC]
ECON 480. Labor Economics (4)

No more than 4 credits of self-study courses (ECON 401–406, 408–410) may be counted toward the 51-credit requirement.

All students must receive a grade of C (2.00) or better in all upper-division required courses and must maintain an overall grade-point average (GPA) of 2.00 in all courses taken for the option.

Majors may not select S/U grading in any economics classes.

Total=51–55

Footnotes:

* Baccalaureate Core Course
^ Writing Intensive Course (WIC)

MATHEMATICAL ECONOMICS OPTION

As the economics profession becomes increasingly mathematical, economics majors who plan to go to graduate school need a strong math background. The Mathematical Economics option provides the necessary mathematical preparation for graduate school bound economics majors. It also serves students who desire a more quantitative program or who come into the major with significant math preparation to apply math toward their degrees in economics.

Economics Core Curriculum (32)

ECON 201. *Introduction to Microeconomics (4)
ECON 202. *Introduction to Macroeconomics (4)

ECON 411. Advanced Microeconomic Theory (4)
 ECON 415. Advanced Macroeconomic Theory (4)
 ECON 423. Econometrics I (4)
 ECON 427. Econometrics II (4)
 ECON 428. ^Introduction to Economic Research (4)
 or ECON 439. ^Public Policy Analysis (4)
 or ECON 463. ^Efficiency and Productivity Analysis (4)
 MTH 241. *Calculus for Management and Social Science (4)
 or MTH 251. *Differential Calculus (4)

Additional Requirements (19)

ECON 329. Introduction to Mathematical Economics (4)
 MTH 252. Integral Calculus (4)
 MTH 254. Vector Calculus I (4)
 MTH 341. Linear Algebra I (3)
 MTH 342. Linear Algebra II (4)

Total credits=51

All students must receive a grade of C (2.00) or better in all upper-division required courses and must maintain an overall grade-point average (GPA) of 2.00 in all courses taken for the option.

Majors may not select S/U grading in any economics classes.

No more than 4 credits from ECON 402, ECON 403, ECON 405, and ECON 410 may be used to satisfy major requirements.

POLITICAL SCIENCE (BA, BS, CRED, HBA, HBS)

Students selecting the Political Science major must complete 52 credits of political science course work, of which at least 36 credits must be upper-division courses. As part of these overall credit totals, Political Science majors must complete:

I. Three Foundation Courses

The school encourages students to take the foundation courses in their first or second year.

Students must take 3 out of 4 introductory courses from:

PS 201. *Introduction to United States Government and Politics (4)
 PS 204. *Introduction to Comparative Politics (4)
 PS 205. *Introduction to International Relations (4)
 PS 206. *Introduction to Political Thought (4)

Students who choose to specialize in one of the options for the major are required to take two of the introductory courses as specified for the option and can choose the third introductory course.

Prerequisites for upper-division political science courses are determined on a course-by-course basis by the appropriate instructor(s). Often, the corresponding introductory course is a prerequisite for an upper-division course in the same subfield. (For example, PS 201 Introduction to United States Government and

Politics must be taken prior to enrolling in PS 321 American Constitutional Law.)

II. Methods/WIC

Students must take the designated Methods/WIC course for the major. The school encourages students to take the Methods/WIC course late in their second or early in their third year.

PS 300. ^Political Analysis (4)

III. Political Field Work Requirement Either:

PS 406. Projects (2) and PS 410. Political Science Internship (2–12)

Or:

Petition the program in writing to accept other field political experience.

Students may take up to 12 credits of PS 410, Political Science Internship, but only 4 of these credits will count toward the Political Science major or minor.

Credits over the 4-credit maximum may be applied toward general graduation requirements.

IV. Upper-Division Subfield Courses

A. For the general major, students must take:

One course each from at least three of the four following subfields:

1. American national government and politics, to include the judiciary, state and local government, public policy, public administration: PS 317, 321, 322, 323, 326, 331, 371, 375, 411, 412, 413, 414, 415, 416, 419, 425, 427 (pending approval #83333), 429, 455, 475, 476, 477, or 479.
2. Comparative politics: PS 340, 341, 343, 344, 345, 348, 350, 446, or 449.
3. International relations: PS 351, 454, 455, 456, 457, 458, 459, or 477.
4. Political philosophy: PS 361, 362, 363, 365, 461, 462, or 469.

B. For the options, students will choose from a list of courses approved for the option.

V. Potential for Specialization

Students may choose a general political science major or may choose from one of three transcript-visible options:

1. Environmental Politics and Policy
2. International Affairs
3. Law, Politics, and Society

VI. Additional Requirements for the Major

- Majors are required to maintain a minimum cumulative 2.50 grade-point average for all political science course work.
- No more than 8 credits from PS 401–PS 410 may be applied to the major.
- Students must complete the BA or BS requirements specified by the College of Liberal Arts.

Footnotes:

* Bacc Core Course

^ Writing Intensive Course

OPTIONS

ENVIRONMENTAL POLITICS AND POLICY OPTION

The Environmental Politics and Policy option under the Political Science major will provide students with the opportunity to focus their undergraduate studies on topics involving:

- Historical and contemporary environmental problems
- Governmental and non-governmental efforts to address problems on local, state, federal and international levels
- Interactions between key actors and institutions involved in environmental policymaking in the United States and internationally

Foundation Courses (12)

Students must take 3 of the introductory courses (12)

PS 201. *Introduction to United States Government and Politics (4)

PS 205. *Introduction to International Relations (4)

Either PS 204. *Introduction to Comparative Politics (4) or PS 206. *Introduction to Political Thought (4)

Methods/WIC (4)

PS 300. ^Political Analysis (4)

Political Science Internship (4)

PS 406. Projects (2)

PS 410. Political Science Internship (2)

Upper-Division Option Courses (32) Select 32 credits from the list below.

Up to 8 upper-division credits can come from classes listed below in the programs of economics and sociology. Other courses as approved by the department.

PS 331. State and Local Government and Politics (4)

PS 370. *Science, Religion, and Politics (4)

PS 371. Public Policy Problems (4)

PS 411. Legislative Politics (4)

PS 412. Presidential Politics (4)

PS 414. Interest Groups (4)

PS 416. Public Opinion and Politics (4)

PS 454. International Law and Organizations (4)

PS 455. The Politics of Climate Change (4)

PS 461. Environmental Political Theory (4)

PS 473. US Energy Policy (4)

PS 475. Environmental Politics and Policy (4)

PS 476. *Science and Politics (4)

PS 477. International Environmental Politics and Policy (4)

PS 479. Topics in Public Policy and Public Administration (4)

Up to 8 credits from the list below:

ECON 352. *Environmental Economics and Policy (3)

or AREC 352. *Environmental Economics and Policy (3)

ECON 466. Energy Economics (4)

SOC 456. *Science and Technology in Social Context (4)

SOC 480. *Environmental Sociology (4)

SOC 481. *Society and Natural Resources (4)

SOC/ANS/FS/FW 485. *Consensus and Natural Resources (3)

Footnotes:

* Baccalaureate Core Course. Major courses cannot double count for baccalaureate core requirements.

^ Writing Intensive Course

INTERNATIONAL AFFAIRS OPTION

The International Affairs option provides students with the opportunity to focus their undergraduate studies on topics involving:

- The political systems and dynamics of different countries and regions around the world
- Relations among countries and non-state actors
- Global issues, problems, and institutions

Foundation courses (12 credits)

Select 3 of the following introductory courses:

PS 204. *Introduction to Comparative Politics (4)

PS 205. *Introduction to International Relations (4)

Either PS 201. *Introduction to United States Government and Politics (4)
or PS 206. *Introduction to Political Thought (4)

Methods/WIC (4 credits)

PS 300. ^Political Analysis (4)

Political Science Internship (4 credits)

PS 406. Projects (2)

PS 410. Political Science Internship (2)

Upper Division Option Courses (32 credits)

Select 32 credits from the list below.

Up to 8 upper-division credits can come from classes listed below in the programs of Economics and Sociology. Other courses as approved by the department.

PS 340. Eastern and Central European Politics (4)

PS 341. Politics of Western Europe and the European Union (4)

PS 343. *Russian Politics (4)

PS 344. Latin American Politics (4)

PS 345. Politics of Developing Nations (4)

PS 348. Chinese Politics (4)

PS 350. Government and Politics of Modern Japan (4)

PS 351. American Foreign Policy (4)

PS 446. East Asian Political Economy (4)

PS 449. ^Topics in Comparative Politics (4)

PS 453. The Geopolitics of Oil and Energy (4) [**Pending approval of 83517**]

PS 454. International Law and Organizations (4)

PS 455. The Politics of Climate Change (4)

PS 456. International Politics of Asia Pacific (4)

PS 457. US-China Relations (4)

PS 458. International Political Economy (4)

PS 459. ^Topics in International Relations (4)

PS 477. International Environmental Politics and Policy (4)

Select up to 8 credits from:

ECON 340. International Economics (4)

ECON 440. Economics of Globalization (4)

ECON 441. International Finance Theory and Policy (4)

ECON 455. Economic Development (4)

SOC 460. The Sociology of Globalization (4)

SOC 466. International Development: Gender Issues (4)

Footnotes:

* Baccalaureate Core Course. Major courses cannot double count for baccalaureate core requirements.

^ Writing Intensive Course

LAW, POLITICS AND SOCIETY OPTION

The Law, Politics and Society option offers students the opportunity to focus their undergraduate studies on topics involving:

- The role of the courts and other relevant institutions in defining the breadth and scope of government
- Judicial procedures and behaviors and their implications for our democracy
- Relationships between the various branches of the U.S. government, as well as between state and federal governments
- Normative arguments regarding justice and equality in theory and in practice

Foundation Courses (12 credits)

Students must take 3 of introductory courses from below:

PS 201. *Introduction to United States Government and Politics (4)

PS 206. *Introduction to Political Thought (4)

Either PS 204. *Introduction to Comparative Politics (4)

or PS 205. *Introduction to International Relations (4)

Methods/WIC (4 credits)

PS 300. ^Political Analysis (4)

Political Science Internship (4 credits)

PS 406. Projects (2)

PS 410. Political Science Internship (2)

Upper-Division Option Courses (32 credits)

Select 32 credits from the list below.

Up to 8 upper division credits can come from classes listed below in the programs of Economics and Sociology. Other courses as approved by the department.

PS 321. American Constitutional Law (4)

PS 322. American Constitutional Law (4)

PS 326. Judicial Process and Politics (4)

PS 331. State and Local Government and Politics (4)

PS 361. Classical Political Thought (4)

PS 362. Modern Political Thought (4)

PS 363. *Gender and Race in American Political Thought (4)

PS 365. American Political Thought (4)

PS 411. Legislative Politics (4)

PS 412. Presidential Politics (4)

PS 423. American Constitutional Law (4)

Pending approval of 83330

PS 425. *Gender and Law (4)

PS 427. Courts and Social Change (4)

Pending approval of 83333

PS 429. ^Topics in Judicial Politics (4)

PS 454. International Law and Organizations (4)

PS 462. Theories of Law (4)

Select up to 8 credits from:

ECON 461. Law, Economics, and Regulation (4)

SOC 340. Deviant Behavior and Social Control (4)

SOC 438. US Immigration Issues in the 21st Century (4)

SOC 440. Juvenile Delinquency (4)

SOC 441. Criminology and Penology (4)

SOC 442. Sociology of Drug Use and Abuse (4)

SOC 448. Law and Society (3)

Footnotes:

* Baccalaureate Core Course. Major courses cannot double count for baccalaureate core requirements.

^ Writing Intensive Course

SOCIOLOGY (BA, BS, CRED, HBA, HBS)

Sociology (BA, BS) is also available on the OSU-Cascades Campus.

Sociology is the study of human social behavior and sociologists examine interactions within and between groups and resulting social institutions. The undergraduate program in sociology provides a general analysis and broad understanding of human societies and culture for persons in all fields. Selecting courses around a topic or theme of interest adds meaning to one's education and strengthens the base of understanding from which one can pursue a career or further education. Two options are currently available for those interested — Crime and Justice, and Environmental and Natural Resource Sociology — although students can shape a custom theme such as international development or social policy.

Core

SOC 204. *Introduction to Sociology (3)

[Prereq. to all upper-division sociology courses]+

SOC 315. ^Methods I: Research Design (4)+

SOC 316. ^Methods II: Quantitative Analysis (4)+

SOC 413. Sociological Theory (4)+

Sociology electives (33)

Maximum of 12 at lower division

Maximum of 8 credits in courses numbered SOC 401 to 410.

Total=48

Transfer students may apply a maximum of 12 credits of lower-division sociology credits toward a degree in sociology.

A minimum grade-point average of 2.00 must be earned in sociology course work. A grade of C– or above is required in SOC 315, SOC 316, and SOC 413.

Footnotes:

- * Baccalaureate Core Course
- ^ Writing Intensive Course (WIC)
- + Also offered online via Ecampus

OPTIONS**CRIME AND JUSTICE OPTION**

This option provides students with the ability to apply social science concepts and approaches to better understand and analyze relationships between crime, justice, and public policy from a sociological perspective. The option has particular relevance for sociology students aspiring to careers in criminal justice, law, or social services, as well as those preparing for advanced/graduate programs in criminology, criminal justice, or public policy. Academic internships are available in local criminal justice and social service agencies, offering a unique combination of scholarly analysis and practical experience for students seeking careers in fields such as law, policing, corrections, and social work.

Required

SOC 241. Introduction to Criminal Justice (3)+

Choose 3 of the following 4 courses:

- SOC 340. Deviant Behavior and Social Control (4)+
- SOC 440. Juvenile Delinquency (4)
- SOC 441. Criminology and Penology (4)+
- SOC 442. Sociology of Drug Use and Abuse (4)

Elective Courses

- SOC 206. Social Problems (3)+
- SOC 299. Special Topics: *Sociology of Madness* (3)
- SOC 410. Internship Practicum (1–4)+
- SOC 426. *Social Inequality (4)+
- SOC 430. Gender and Society (4)
- SOC 437. Race and Ethnic Relations (4)
- SOC 448. Law and Society (4)
- SOC 470. Collective Behavior (4)
- SOC 499. Special Topics (1–16)

Total=27**Footnotes:**

- * Baccalaureate Core Course
- + Also offered online via Ecampus

ENVIRONMENTAL AND NATURAL RESOURCE SOCIOLOGY OPTION

The option is designed to provide students with the ability to apply social science concepts and approaches to better understand relationships between societies and their bio-physical environment from a sociological perspective. This option has great relevance for sociology students aspiring to careers in natural resource and environmental policy, planning, management, and education, as well as preparation for advanced/graduate programs related to environmental law and environment/natural resource sociology or policy.

Required Courses

SOC 480. *Environmental Sociology (4)+
SOC 481. *Society and Natural Resources (4)+

Elective Courses

- SOC 360. *Population Trends and Policy (4)+
- SOC 454. *Leisure and Culture (4) (SS)+
- SOC 456. *Science and Technology in a Social Context (4)+
- SOC 475. Rural Sociology (4)+
- SOC 485. *Consensus and Natural Resources (3)+
- SOC 499. Special Topics (related to community and demography) (1–16)
- SOC 410. Internship Experience (1–4)

No more than two of the following elective courses can count toward the option:

- ANTH 481. *Natural Resources and Community Values (3)+
- GEO 420. Geography of Resource Use (3)
- GEO 423. Land Use in the American West (3)
- PHL 440. Environmental Ethics (3) (HC)+
- PHL 443. *World Views and Environmental Values (3) (NC)+
- PS 475. Environmental Politics and Policy (4)+
- NR 455. Natural Resource Decision Making (3)+ (*on-campus section needs instructor approval*)

Total=21**Footnotes:**

- * Baccalaureate Core Course
- + Also offered online via Ecampus
- SS = College of Liberal Arts (social core)
- HC = CLA (humanities core)
- NC = CLA (non-Western core)

SOCIAL SCIENCE (BA, BS, CRED, HBA)**Available only****on OSU-Cascades Campus.**

The Social Science major is only offered at the OSU-Cascades Campus through the Division of Arts and Sciences, College of Liberal Arts at OSU. The first two years of course work will be offered at Central Oregon Community College (COCC). The upper-division courses are offered on the OSU-Cascades campus. Students will also be able to take advantage of distance courses offered by OSU E-campus and streamed via TV from Corvallis.

Baccalaureate Core (48)**College of Liberal Arts****Requirements**

Courses taken to fulfill College of Liberal Arts Requirements cannot be used to fulfill BACC Core, major cores or Option requirements.

Core (5 courses)

[*These requirements can be fulfilled at Oregon Community Colleges.*]

- Humanities
- Fine Arts
- Non-Western Culture
- Social Science
- Methods course (fulfills additional course requirement)

Lower-Division Requirements

Choose either BS or BA: [*These requirements can be fulfilled at Oregon community colleges.*]

For a Bachelor of Science (20 credits):

1. Select 8 credits from the following MTH courses: MTH 111, 112, 113, 211, 241, 243, 244, 247, 251
2. One additional 3-credit course from the science departments except Math and ST (no lab required) (3 credits)
3. One computer science course (4 credits)

For a Bachelor of Arts (18 credits):

Two years of a foreign language with a grade of C– or better

Social Science Major (28–35 credits)

Note: Courses taken to fulfill major requirements cannot be used to fulfill Bacc Core, College of Liberal Arts, or option requirements. Not all courses are offered every year. Students should consult the annual schedule of classes for a listing of available courses for the academic year.

Social Science Core**Choose 6 courses, no more than 3 from any discipline:**

- ANTH 311, 313, 314, 315, 316, 317, 318, or 319. Peoples of the World (3)
- ANTH 350. Language, Culture and Society (4)
- ANTH 370. ^Anthropological Theories (4)
- ANTH 473. Gender, Ethnicity, and Culture (3)
- ANTH 477. Ecological Anthropology (4)
- ANTH 479. Anthropology of Migration (4)
- ANTH 484. *Wealth and Poverty (3)
- ANTH 486. Anthropology of Food (2–6)
- COMM 321. Introduction to Communication Theory (3)
- COMM 322. Small-Group Problem Solving (3)
- COMM 326. Intercultural Communication (3)
- COMM 328. Nonverbal Communication (3)
- COMM 416. Ethnography of Communication (3)
- COMM 418. ^Interpersonal Communication Theory and Research (3)
- COMM 422. ^Small-Group Communication Theory and Research (3)
- COMM 427. Cultural Codes of Communication (3)
- COMM 440. Theories of Conflict and Conflict Management (3)
- PS 317. Gender and Politics (4)
- PS 365. American Political Thought (4)
- PS 415. Politics and the Media (4)
- PS 461. Environmental Political Theory (4)
- SOC 312. *Sociology of the Family (4)
- SOC 412. Sociology of Work and Family (4)
- SOC 439. Welfare and Social Services (4)
- SOC 475. Rural Sociology (4)

Environmental Science Core (9–11 credits)**Select 1 course from the following list:**

- GEO 305. *Living with Active Cascades Volcanoes (3)
- GEO 307. *National Park Geology and Preservation (3)
- GEO 308. *Global Change and Earth

Sciences (3)
 GEO 322. Surface Processes (4)
 GEO 329. Geography of US and Canada (3)^E
 GEO 335. *Introduction to Water and Science Policy (3)
 GEO 380. *Earthquakes in the Pacific Northwest (3)^E

Select 2 science courses from the list:

Agriculture and Resource Economics
 AREC 250. *Introduction to Environmental Economics and Policy (3)^E
 AREC 253. *Environmental Law, Policy and Economics (4)^E
 AREC 351. *Natural Resource Economics and Policy (3)
 AREC 432. Environmental Law (4)^E
 BI 311. Genetics (4)
 BI 370. Ecology (3)
 BI 445. Evolution (3)

Computer Science
 CS 391. *Social and Ethical Issues in Computer Science (3)^F

Crop and Social Science
 SOIL 395. *World Soil Resources (3)

Environmental Sciences
 ENSC 479. *Environmental Case Studies (3)^E

Fisheries and Wildlife
 FW 340. *Multicultural Perspectives in Natural Resources (3)
 FW/FES 445. Ecological Restoration (4)

Natural Resources
 NR 350. *Sustainable Communities (3)
 NR 455. Natural Resource Decision Making (4)

Footnotes:
 * Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)
^E Ecampus Course

OPTIONS

COMMUNITY DEVELOPMENT AND LEADERSHIP OPTION

Not all courses are offered every year. Students should consult the annual schedule of classes for a listing of available courses for the academic year. All courses are offered at OSU-Cascades with the exception of COMM 114 and PS 201, which are offered at Oregon community colleges.

Choose one course:
 COMM 323. Community Dialogue (4) [Pending curriculum council approval.]
 or COMM 325. Communicating Leadership (4) [Pending curriculum council approval.]
Choose five courses different from the one taken above:
 BA 352. Managing Individual and Team Performance (4)
 COMM 114. Argument and Critical Discourse (3)
 COMM 323. Community Dialogue (4) [Pending curriculum council approval.]
 or COMM 325. Communicating Leadership (4) [Pending curriculum council approval.]

COMM 425. Communication and Youth Outreach (4)
 COMM 440. Theories of Conflict and Conflict Management (3)
 LS 499. Special Topics: *Funding and Resource Development* (4)
 PS 201. *Introduction to US Government and Politics (4)
 PS 331. State and Local Government and Politics (4)
 PS 461. Environmental Political Theory (4)
 PS 475. Environmental Politics and Policy (4)

Total=22–24

UNDERGRADUATE MINORS

ASIAN STUDIES MINOR

The minor program will provide an opportunity for students majoring in fields such as business, engineering, or sciences who will be working in Asia or with Asians. They will gain a significant degree of cultural literacy that will be critical for their professional success. In addition, the program will be an outstanding supplement to a traditional liberal arts major for students with particular interests in Asia, who want to study abroad, or who plan to go on to do graduate work in areas with concentrations in aspects of Asia.

Required 27–28 credits

HST 392. *Modern China and Japan (4)
 PHL 312. *Asian Thought (4)

Select 15–16 credits from the following (two disciplines):

ANTH 316. *Peoples of the World—South and Southeast Asia (3)
 ANTH 318. *Peoples of the World—China (3)
 ANTH 319. *Peoples of the World—Japan and Korea (3)
 ART 208. *Introduction to Asian Art (3)
 ART 397. Selected Topics in Global Art History: Art of China I (3)
 ART 397. Selected Topics in Global Art History: Art of China II (3)
 ART 397. Selected Topics in Global Art History: Art of Japan (3)
 BA 347. International Business (4)
 CHN 331. *Chinese Culture (3)
 CHN 332. *Chinese Culture (3)
 CHN 333. *Chinese Culture (3)
 ES 231. *Asian American Studies: Mid-1800s-Present (4)
 ES 233. *Asian American Studies II: Activism and Empowerment (3)
 ES 332. Asian Pacific Americans and the Media (3)
 ES 334. *Asian American Literature (3)
 ES 352. *Asian Representation in Hollywood and Independent Cinemas (3)
 GEO 327. *Geography of Asia (3)
 GEO 330. *Geography of International Development and Globalization (3)
 HST 391. *East Asia (4)
 HST 396. *Gender, Family and Politics in Traditional China (4)
 HST 397. *Gender, Family and Politics in Modern China (4)
 JPN 331. *Japanese Culture (3)

JPN 332. *Japanese Culture (3)
 JPN 333. *Japanese Culture (3)
 PHL 208. Introduction to Buddhist Traditions (4)
 PHL 371. *Philosophies of China (4)
 PS 348. Chinese Politics (4)
 PS 350. Government and Politics of Modern Japan (4)

Select 7–8 credits from the following:

ANTH 488. *Business and Asian Culture (3)
 ANTH 562. Minority Cultures of China (3)
 ART 497. Selected Topics in Global Art History: Chinese Calligraphy (3)
 ART 497. Selected Topics in Global Art History: Contemporary Chinese Art (3)
 ES 437/ES 537. Gender Issues in Asian American Studies (3)
 HST 494. Modern Japan: a Cultural History (4)
 HST 495. China in the Twentieth Century (4)
 PHL 430/PHL 530. History of Buddhist Philosophy (4)
 PS 446/PS 546. East Asian Political Economy (4)
 PS 456/PS 556. International Politics of Asia Pacific (4)
 PS 457/PS 557. US-China Relations (4)

Footnotes:

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

ECONOMICS MINOR

Also available via Ecampus.

Students minoring in economics must complete a minimum of 27 credits with a GPA of at least 2.0 in their program of study. A maximum of two classes (8 credits) may be taken on an S/U basis. Course requirements for the Economics minor:

ECON 201. *Introduction to Microeconomics (4)
 ECON 202. *Introduction to Macroeconomics (4)
 ECON 311. Intermediate Microeconomic Theory I (4)
 or ECON 411. Advanced Microeconomic Theory (4)
 Plus upper-division courses in economics (15)

Notes:

- ST 351, Introduction to Statistical Methods, serves as a substitute for 4 credits of economics upper-division course work when ECON 424, Introduction to Econometrics, is part of the student's program.
- Students cannot receive credit toward the minor for both ECON 311 and ECON 411.
- Students are advised to consult with the Economics advisor before completing their course work.

POLITICAL SCIENCE MINOR

Also available via Ecampus.

Students selecting the Political Science minor must complete 28 credits of political science, including at least two 4-credit introductory courses (chosen from PS 201, PS 204, PS 205, and PS 206) and

at least 20 credits at the upper-division level.

No more than 8 credits from PS 401–PS 410 may be applied to the minor.

SOCIOLOGY MINOR

Also available via Ecampus.

Undergraduate students may elect a Sociology minor to complement course work in their major discipline. The Sociology minor also is available through Extended Campus (Ecampus).

Transfer students may apply a maximum of 12 credits of lower-division sociology credits toward the Sociology minor.

A minimum GPA of 2.00 must be earned in sociology course work.

Core (7)

SOC 204. *Introduction to Sociology (3)
(Prerequisite to all upper-division courses)

Select one theory or methods course from the following:

SOC 340. Deviant Behavior and Social Control (4)

SOC 418. Qualitative Research Methods (4)

SOC 421. Social Change and Modernization (3)+

SOC 424. Social Psychology (4)

SOC 426. *Social Inequality (4)+

SOC 450. Sociology of Education (4)+

SOC 452. Sociology of Religion (4)

SOC 456. *Science and Technology in Social Context (4)+

A maximum of 12 credits of lower-division courses.

A maximum of 3 credits from SOC 401 to SOC 410.

Additional sociology courses as necessary to total 27 credits.

Total=27

Footnotes:

* Baccalaureate Core Course

+ Also offered online via Ecampus

PUBLIC POLICY (MPP, PhD)

Graduate Areas of Concentration

Energy policy; environmental policy; international policy; law, crime, and policy; rural policy; science and technology policy; social policy

Oregon State University offers graduate programs in public policy to students interested in energy policy; environmental policy; international policy; law, crime, and policy; rural policy; science and technology policy; and/or social policy. The degrees are granted by the College of Liberal Arts and provide graduate education for students wishing to develop their interests and careers in the public and nonprofit sectors. The Master of Public Policy (MPP) specifically prepares students for careers in domestic and international organizations and offers training for “in-service” students (already employed) desiring professional growth and advancement. The PhD in Public Policy prepares students for academic or non-academic research careers in the public, private, and nongovernmental

sectors. The Public Policy Graduate Program accepts students with backgrounds in related academic disciplines. The degrees are designed to provide individuals with analytic skills, an understanding of public policy processes, and substantive knowledge in a specific policy area.

To see details outlined in a brochure, go to <http://oregonstate.edu/cla/spp/graduate>.

For more information, contact:

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Email: mpp@oregonstate.edu

Website: <http://oregonstate.edu/cla/mpp/>

POLITICAL SCIENCE GRADUATE MINOR

Graduate Areas of Concentration

American politics, judicial politics, public administration, political theory, state and local government, international relations, comparative politics, gender politics, environmental policy

Graduate work in the School of Public Policy may serve as a field of study for a Master of Arts in Interdisciplinary Studies degree or the Master of Public Policy degree or as a minor in other advanced degree programs.

The program aims to provide a systematic understanding of political processes, institutions, theories, and behavior. Students are strongly urged to acquire competence in statistics and computer data processing as aids in analyzing political phenomena. A program of study suited to the student's individual interests is arranged with a faculty advisor.

Students applying for graduate work in political science must meet the following requirements:

1. A minimum overall undergraduate GPA of 3.00.
2. Appropriate undergraduate course work in political science (normally such course work will include foundation courses such as American government and politics, introduction to political science, or introduction to political thought).
3. Prior approval of an advisor in the applicant's chosen area of study.

No action will be taken on any applicant's materials until a meeting with an advisor has taken place. Areas of study include American politics, public policy, judicial politics, public administration, political theory, state and local government, international relations, comparative politics, methodology, and gender politics.

SOCIOLOGY GRADUATE MINOR

Graduate Areas of Concentration

Environmental and natural resources, international sociology, social policy

Sociology in the School of Public Policy serves as a minor field in the Master of Arts in Interdisciplinary Studies degree program and participates as a minor field in other advanced degree programs. The MAIS program is designed to meet the particular needs and interests of the individual student and features collaborative work in any two other pertinent departments. Further information can be obtained by writing the School of Public Policy, 307 Fairbanks Hall, OSU, Corvallis, OR 97331-3703.

ECONOMICS COURSES

ECON 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ECON 201. *INTRODUCTION TO MICROECONOMICS (4). An introduction to microeconomic principles including the study of price theory, economic scarcity, consumer behavior, production costs, the theory of the firm, market structure, and income distribution. Other selected topics may include market failure, international economics, and public finance. (SS) (Bacc Core Course) **PREREQS:** MTH 111 or equivalent is recommended.

ECON 201H. *INTRODUCTION TO MICROECONOMICS (4). An introduction to microeconomic principles including the study of price theory, economic scarcity, consumer behavior, production costs, the theory of the firm, market structure, and income distribution. Other selected topics may include market failure, international economics, and public finance. (SS) (Bacc Core Course) **PREREQS:** MTH 111 or equivalent is recommended. Honors College approval required.

ECON 202. *INTRODUCTION TO MACROECONOMICS (4). An introduction to macroeconomic principles including study of the theories of output determination, consumption, investment, inflation, unemployment, and fiscal and monetary policy. Other selected topics may include the study of the international balance of payments, growth and development, and urban and regional problems. (SS) (Bacc Core Course) **PREREQS:** MTH 111 or equivalent is recommended.

ECON 202H. *INTRODUCTION TO MACROECONOMICS (4). An introduction to macroeconomic principles including study of the theories of output determination, consumption, investment, inflation, unemployment, and fiscal and monetary policy. Other selected topics may include the study of the international balance of payments, growth and development, and urban and regional problems. (SS) (Bacc Core Course) **PREREQS:** MTH 111 or equivalent is recommended. Honors College approval required.

ECON 311. INTERMEDIATE MICROECONOMIC THEORY (4). An examination of demand theory, production and cost theory, game theory, behavioral economics, competitive and imperfectly competitive markets, and general equilibrium and welfare economics. ECON 311 and ECON 411 cannot both be taken for credit toward the economics major. **PREREQS:** ECON 201

ECON 312. INTERMEDIATE MICROECONOMIC THEORY II (4). An examination of the theories of imperfect competition, input markets, general equilibrium, and welfare economics. **PREREQS:** ECON 311

ECON 315. INTERMEDIATE MACROECONOMIC THEORY (4). An examination of macroeconomic

aggregates, income determination, aggregate demand and supply. The basic macroeconomic models will be discussed such as Keynesian, Classical, Monetarist, and Neo-Classical. ECON 315 and ECON 415 cannot both be taken for credit toward the Economics major. **PREREQS:** ECON 201 and ECON 202

ECON 316. INTERMEDIATE MACROECONOMIC THEORY II (4). An examination of individual sectors of the macro economy, including theories of consumption, investment, money demand and money supply; an introduction to economic growth, open economy macroeconomics, and monetary and fiscal policy issues. **PREREQS:** ECON 315

ECON 329. INTRODUCTION TO MATHEMATICAL ECONOMICS (4). Mathematical methods of economic analysis. Theory of economic structure and optimization developed through calculus and linear algebra, dynamic systems analyzed through integral calculus and difference and differential equations. The mathematical tools are developed in conjunction with their application to economic problems. Some acquaintance with calculus recommended. **PREREQS:** ECON 201 and ECON 202 and (MTH 241 or MTH 251)

ECON 330. MONEY AND BANKING (4). Nature and functions of money; functions and operations of depository institutions; the money market; central banking and monetary policy. (SS) **PREREQS:** ECON 201 and ECON 202

ECON 340. INTERNATIONAL ECONOMICS (4). An overview of international economics with an emphasis on current events and applications, including classical and modern trade theory and the study of trade and exchange-rate policies. (SS) (See Schedule Comment regarding Bacc Core status.) **PREREQS:** ECON 201 and ECON 202

ECON 352. *ENVIRONMENTAL ECONOMICS AND POLICY (3). Provides an overview of the interrelationships between economic activity, the environment, and public policy. Through case studies, discussion groups, readings, and group activities, students learn how economists define and analyze environmental problems and the types of policies they advocate for managing environmental quality. CROSSLISTED as AREC 352. (Bacc Core Course) **PREREQS:** AREC 250 or ECON 201 or ECON 201H

ECON 383. *THE ECONOMICS OF DISCRIMINATION (4). An economic analysis of discrimination, focusing on labor market inequities for women and minorities. Historical and current trends in pay, education, and employment disparities, economic explanations for such disparities, and econometric evidence for wage and employment discrimination. (SS) (Bacc Core Course) **PREREQS:** ECON 201

ECON 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

ECON 399H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

ECON 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECON 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECON 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECON 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECON 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECON 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

ECON 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECON 410. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECON 411. ADVANCED MICROECONOMIC THEORY (4). Rigorous treatment of optimizing behavior of economic agents and markets. Examines utility maximization and demand; cost minimization, profit maximization and supply; perfect competition and monopoly; imperfect competition and game theory; and general equilibrium, social welfare and market failure using sophisticated mathematical tools. Students cannot receive credit toward the major for both ECON 311 and ECON 411. **PREREQS:** ECON 201 and (MTH 241 or MTH 251)

ECON 414. POLITICAL AND BEHAVIORAL ECONOMICS (4). Economic analysis of politics and the intersection of psychology and economics. Topics include voter behavior, strategic policy formation and influence, and the primary behavioral deviations from the neoclassical model of rational self-interest. **PREREQS:** ECON 311 or ECON 411

ECON 415. ADVANCED MACROECONOMIC THEORY (4). Macroeconomics as an application of general equilibrium theory. Macroeconomic models are developed taking preferences and technology as primitives. The models' short and long run predictions are analyzed and compared to the data. The welfare implications of fiscal and monetary policy are discussed. ECON 315 and ECON 415 cannot both be taken for credit toward the major. **PREREQS:** ECON 201 and ECON 202 and (MTH 241 or MTH 251)

ECON 423. ECONOMETRICS I (4). Introduction to probability and statistics with an emphasis on estimation and hypothesis testing. Applications to economic models. **PREREQS:** MTH 241 or MTH 251 or MTH 251H and MTH 241 or MTH 251

ECON 424. INTRODUCTION TO ECONOMETRICS (4). Application of statistical techniques, including sampling theory, hypothesis testing, and multiple regression analysis, to economic models. Economic modeling, analysis of economic data, and policy analysis are emphasized. ECON 424 and ECON 427 cannot both be taken for credit toward the major. Lec/lab. **PREREQS:** ((ECON 311 and ST 351) or (ECON 411 and ECON 423))

ECON 427. ECONOMETRICS II (4). Addresses both the theory and practice of econometrics, including properties of estimators, modeling economic processes, estimation, hypothesis testing, prediction and interpretation of results. Students cannot receive credit toward the major for both ECON 424 and ECON 427. Lec/lab. **PREREQS:** ECON 423 and (MTH 241 or MTH 251)

ECON 428. ^INTRODUCTION TO ECONOMIC RESEARCH (4). Basic methods of economic research: concepts and models; data sources, collection, and presentation; hypothesis formulation and testing; policy analysis. Written assignments apply methods. (Writing Intensive Course) **PREREQS:** ECON 311 or ECON 315

ECON 435. THE PUBLIC ECONOMY (4). Composition and growth of government spending; theory of public expenditure; analysis of public expenditure programs; benefit-cost analysis; theory and practice of taxation; analysis of local, state, and federal taxes; government borrowing and fees; current issues in tax and expenditure policy. **PREREQS:** ECON 311

ECON 439. ^PUBLIC POLICY ANALYSIS (4). Theory of public problems and decision making. Evaluation of public policy strategies, selected public programs and individual public projects

considering the full range of efficiency and equity effects. Direct and indirect impacts of policy, strength of implicit incentives, administrative feasibility, and problems of policy implementation. (Writing Intensive Course) **PREREQS:** ECON 311 and ECON 435 or equivalent

ECON 440. ECONOMICS OF GLOBALIZATION (4). Examination of the phenomenon of globalization using economic analysis to explore controversial themes of the globalization debate--offshoring, sweatshops, child labor, environmental standards, intellectual property protection, cultural diversity, economic development, immigration, and governance. **PREREQS:** ECON 311

ECON 441. INTERNATIONAL FINANCE THEORY AND POLICY (4). Theories and policies of exchange rate regimes; fixed, floating and managed floats; internal and external trade and capital balances; international capital flows and institutions. **PREREQS:** ECON 315

ECON 455. ECONOMIC DEVELOPMENT (4). History, theories and policies for economic development in the Third World of underdeveloped countries. (SS) **PREREQS:** ECON 201 and ECON 202

ECON 460. INDUSTRIAL ORGANIZATION THEORY AND POLICY (4). The study of the causes and effects of firm and market structures, conduct, and performance; United States antitrust and other laws regulating business behavior. **PREREQS:** ECON 311

ECON 461. LAW, ECONOMICS, AND REGULATION (4). The analysis of the effectiveness of laws and government regulations in fostering economic efficiency and fairness. Topics include the design of laws and policies to promote social welfare and the study of the effectiveness of criminal law, antitrust law, and the government regulation of business in promoting social goals. **PREREQS:** ECON 201

ECON 462. MANAGERIAL ECONOMICS (4). The application of microeconomic theory and quantitative methods to management decisions. Case-oriented course emphasizing actual business decisions. **PREREQS:** ECON 311

ECON 463. ^EFFICIENCY AND PRODUCTIVITY ANALYSIS (4). Workshop on the theory and measurement of performance, especially efficiency and productivity. Emphasis on application including introduction to user-friendly software. Design, implementation and write-up of an analysis of performance. (Writing Intensive Course) **PREREQS:** ECON 201 and ECON 202 and ECON 311

ECON 465. TRANSPORTATION ECONOMICS (4). Demand, supply, and pricing for transport facilities, (airports, ports) right of way (highways, waterways), including optimal user fees, congestion tolls, and second-best pricing schemes. Theories of economic regulation and evaluation of experience in the transport sector. **PREREQS:** ECON 311

ECON 466. ENERGY ECONOMICS (4). Examines the economics of oil, coal, natural gas production and their use, as well as substitutes such as conservation and renewables, focusing on electricity markets, federal and state regulatory frameworks, and resulting public policy issues from a regional and national perspective. **PREREQS:** ECON 201

ECON 480. LABOR ECONOMICS (4). Individual and business choices as determinants of wages and working conditions; human capital theory and the education and training of workers; discrimination and other sources of wage differentials; unemployment and public policy toward labor markets. **PREREQS:** ECON 311

ECON 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECON 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECON 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

ECON 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECON 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECON 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

ECON 510. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits.

ECON 512. MICROECONOMIC THEORY I (4). Economic theories of consumer behavior and demand, production, cost, the firm, supply, and competitive and monopoly market structures. **PREREQS:** ECON 312 or AREC 312

ECON 513. MICROECONOMIC THEORY II (4). Economic theories of imperfect competition, input markets, general equilibrium and welfare economics. **PREREQS:** ECON 512

ECON 514. POLITICAL AND BEHAVIORAL ECONOMICS (4). Economic analysis of politics and the intersection of psychology and economics. Topics include voter behavior, strategic policy formation and influence, and the primary behavioral deviations from the neoclassical model of rational self-interest. **PREREQS:** ECON 311 or ECON 411

ECON 515. MACROECONOMIC THEORY I (4). Determination of income, employment, and prices in classical, Keynesian, monetarist, and new classical macroeconomic models. Theories of consumption, investment, money demand, and money supply. Monetary and fiscal policies, the role of expectations. **PREREQS:** ECON 315 or equivalent

ECON 517. MICROECONOMIC THEORY FOR MPP (4). Familiarizes MPP students who do not have a strong background in microeconomics with the material they will need for their future economics course work. **PREREQS:** Working knowledge of algebra and geometry.

ECON 523. STATISTICS FOR ECONOMETRICS (4). Examines mathematical and statistical topics essential for graduate-level econometric analysis, including matrix algebra, probability and distribution theory (emphasizing joint and conditional distributions), statistical inference, and econometric optimization algorithms. **PREREQS:** MTH 253 and ST 351 and (ST 352 or ECON 424 or ECON 524)

ECON 524. INTRODUCTION TO ECONOMETRICS (4). Application of statistical techniques, including sampling theory, hypothesis testing, and multiple regression analysis, to economic models. Economic modeling, analysis of economic data, and policy analysis are emphasized. **PREREQS:** (ECON 311 and ST 351) or (ECON 411 and ECON 423)

ECON 525. ECONOMETRIC METHODS (4). The use of multiple regression under generalized assumptions, specification problems, an introduction to simultaneous equation estimation, the classical linear model using matrices. Emphasis on the analysis of data and communication of findings. **PREREQS:** (AREC 523 or ECON 523) and (ECON 424 or ECON 524) and (AREC 512 or ECON 512)

ECON 526. APPLIED ECONOMETRICS (4). Model building, hypothesis testing, and appropriate estimation procedures including generalized least squares, seemingly unrelated regressions, simultaneous equations, maximum likelihood, and limited dependent variables. Emphasis on applications and interpretation of results. **PREREQS:** ECON 525

ECON 529. INTRODUCTION TO MATHEMATICAL ECONOMICS (4). Review of the basic linear algebra, vector calculus, and analysis of dynamic systems needed for graduate work in economics. **PREREQS:** MTH 251 or equivalent recommended.

ECON 535. THE PUBLIC ECONOMY (4). Composition and growth of government spending; theory of public expenditure; analysis of public expenditure programs; benefit-cost analysis; theory and practice of taxation; analysis of local, state, and federal taxes; government borrowing and fees; current issues in tax and expenditure policy. **PREREQS:** ECON 311

ECON 539. PUBLIC POLICY ANALYSIS (4). Theory of public problems and decision making. Evaluation of public policy strategies, selected public programs and individual public projects considering the full range of efficiency and equity effects. Direct and indirect impacts of policy, strength of implicit incentives, administrative feasibility, and problems of policy implementation. **PREREQS:** ECON 311 and ECON 435 or equivalent

ECON 540. ECONOMICS OF GLOBALIZATION (4). Examination of the phenomenon of globalization using economic analysis to explore controversial themes of the globalization debate--offshoring, sweatshops, child labor, environmental standards, intellectual property protection, cultural diversity, economic development, immigration, and governance. **PREREQS:** ECON 311

ECON 541. INTERNATIONAL FINANCE THEORY AND POLICY (4). Theories and policies of exchange rate regimes; fixed, floating and managed floats; internal and external trade and capital balances; international capital flows and institutions. **PREREQS:** ECON 315

ECON 555. ECONOMIC DEVELOPMENT (4). History, theories and policies for economic development in the Third World of underdeveloped countries. **PREREQS:** ECON 201 and ECON 202

ECON 560. INDUSTRIAL ORGANIZATION THEORY AND POLICY (4). The study of the causes and effects of firm and market structures, conduct, and performance; United States antitrust and other laws regulating business behavior. **PREREQS:** ECON 311

ECON 561. LAW, ECONOMICS, AND REGULATION (4). The analysis of the effectiveness of laws and government regulations in fostering economic efficiency and fairness. Topics include the design of laws and policies to promote social welfare and the study of the effectiveness of criminal law, antitrust law, and the government regulation of business in promoting social goals. **PREREQS:** ECON 201

ECON 562. MANAGERIAL ECONOMICS (4). The application of microeconomic theory and quantitative methods to management decisions. Case-oriented course emphasizing actual business decisions. **PREREQS:** ECON 311

ECON 563. EFFICIENCY AND PRODUCTIVITY ANALYSIS (4). Workshop on the theory and measurement of performance, especially efficiency and productivity. Emphasis on application including introduction to user-friendly software. Design, implementation and write-up of an analysis of performance. **PREREQS:** ECON 512

ECON 565. TRANSPORTATION ECONOMICS (4). Demand, supply, and pricing for transport facilities, (airports, ports) right of way (highways, waterways), including optimal user fees, congestion tolls, and second-best pricing schemes. Theories of economic regulation and evaluation of experience in the transport sector. **PREREQS:** ECON 311

ECON 566. ENERGY ECONOMICS (4). Examines the economics of oil, coal, natural gas production and their use, as well as substitutes such as conservation and renewables, focusing

on electricity markets, federal and state regulatory frameworks, and resulting public policy issues from a regional and national perspective.

PREREQS: ECON 201

ECON 570. MACROECONOMIC THEORY I (4). Introduction to dynamic macroeconomic theory, including a review of Keynesian models, continuous and discrete time programming, Solow, Ramsey, and endogenous growth models, and real business cycle theory. **PREREQS:** ECON 315 or equivalent.

ECON 571. MACROECONOMIC THEORY II (4). Advanced topics in macroeconomics, including complete and incomplete markets for risk, monetary theory and policy, New-Keynesian models of the business cycle, fiscal policy analysis, and labor markets and unemployment. **PREREQS:** ECON 570

ECON 601. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECON 602. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECON 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

ECON 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECON 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECON 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ECON 610. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits.

ECON 615. ADVANCED MACROECONOMIC THEORY (4). Seminar on advanced macroeconomic issues which include the analysis of open economy macroeconomic models and the application of time series techniques to macroeconomic issues and problems. **PREREQS:** ECON 515

ECON 626. EFFICIENCY AND PRODUCTION MEASUREMENT (4). Axiomatic production theory; efficiency indicators and indexes; issues in aggregation; productivity; network and dynamic models and computational issues. **PREREQS:** (ECON 523 or AREC 523) and (ECON 525 or AREC 525) and (ECON 526 or AREC 526)

ECON 627. APPLIED MICRO-ECONOMETRICS (4). Estimation of panel data models and dynamic panels; nonparametric density estimation; nonparametric and semiparametric regression; local polynomial and NW estimation; stochastic and deterministic frontier models; nonparametric frontiers. **PREREQS:** ECON 626

ECON 628. ADVANCED ECONOMETRICS I (4). Introduction to stochastic processes: stationarity, ergodicity, dependence and Martingale Theory; models of conditional mean: ARMA models; models of conditional variance: GARCH models; multivariate time series: VAR, impulse response functions and Granger causality; unit roots; cointegrating regression; binary choice models and multinomial models truncated and censored models. **PREREQS:** (ECON 523 or AREC 523) and (ECON 525 or AREC 525) and (ECON 526 or AREC 526)

ECON 640. INTERNATIONAL TRADE AND ECONOMIC GROWTH (4). Issues of international trade in the contemporary world, including protection with perfect and imperfect competition, political economy of protection and multilateral trade negotiations, international factor movements, economic integration, and international debt. Analysis of the effects of endogenous innovation

and growth on world trade. **PREREQS:** ECON 513 and ECON 526 and ECON 540

ECON 660. INDUSTRIAL ORGANIZATION AND TECHNOLOGICAL CHANGE (4). Examination of traditional and new theories of industrial organization including causes and consequences of technological change and the study of firm and market organization, behavior, and performance. **PREREQS:** ECON 513 and ECON 526 and ECON 560 or instructor approval required

■ MASTER OF PUBLIC POLICY COURSES

MPP 507. SEMINAR (1-16). Selected issues concerning government, public policy, public affairs or non-profit organizations. This course is repeatable for a maximum of 16 credits. **PREREQS:** MPP Director approval required.

MPP 510. INTERNSHIP (1-16). Supervised work experience in government, public policy, public affairs or non-profit organizations. Reports and appraisals required. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** MPP Director approval required.

MPP 808. WORKSHOP (1-16). This course is repeatable for a maximum of 32 credits.

■ PUBLIC POLICY COURSES

PPOL 501. RESEARCH AND SCHOLARSHIP (1-12). Graded P/N. This course is repeatable for a maximum of 99 credits. **PREREQS:** Faculty permission.

PPOL 505. READING AND CONFERENCE (1-4). This course is repeatable for a maximum of 16 credits. **PREREQS:** Faculty permission.

PPOL 507. SEMINAR (1-4). This course is repeatable for a maximum of 16 credits. **PREREQS:** Faculty permission.

PPOL 599. SPECIAL TOPICS (1-4). This course is repeatable for a maximum of 16 credits. **PREREQS:** Faculty permission.

PPOL 602. INDEPENDENT STUDY (1-4). This course is repeatable for a maximum of 16 credits. **PREREQS:** Faculty permission.

PPOL 603. THESIS (1-12). This course is repeatable for a maximum of 999 credits. **PREREQS:** Faculty permission.

PPOL 609. PRACTICUM (1-12). This course is repeatable for a maximum of 24 credits. **PREREQS:** Faculty permission.

PPOL 613. ADVANCED POLICY THEORY I (4). First of two-class series introducing a comprehensive review of public policy theory focused on examining theoretical approaches to understanding the complex and contentious assumptions and premises that pose challenges to the way we conduct public policy. **PREREQS:** PhD standing.

PPOL 614. ADVANCED POLICY THEORY II (4). Second course in a two-course series providing a comprehensive review of public policy theory. The course examines theoretical approaches to understanding the complex and contentious assumptions and premises that pose challenges to the way we conduct public policy.

PPOL 621. ADVANCED QUANTITATIVE METHODS (4). Methods used in research in the social sciences, focused on causal inference in public policy contexts. Covers methods used at the frontier of research to estimate the causal effect of policies on outcomes, including instrumental variables, regression discontinuity, and difference-in-differences estimation. **PREREQS:** ECON 524 or equivalent

PPOL 622. ADVANCED POLICY ANALYSIS (4). Introduction to advanced quantitative modeling used in policy analysis, with an emphasis on the application of modeling techniques to research papers. Focus is predominantly on counts and

zero-truncated modeling, time series, and panel regression. **PREREQS:** ((SOC 516 and ECON 524) or PPOL 621 or (AEC 523 and AEC 525))

PPOL 628. ADVANCED QUALITATIVE METHODS (4). Focus on epistemological approaches, research design, data analysis techniques and critiques of qualitative research, with emphasis on participant observation and interviewing. Culminates in the written and oral presentation of a qualitative research proposal, including preliminary results from fieldwork conducted during the course. **PREREQS:** ANTH 591 or HDF5 538 or SOC 518 and PhD standing or permission of instructor.

PPOL 699. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

■ POLITICAL SCIENCE COURSES

PS 126. INTRODUCTION TO LAW AND POLITICS (3). Introductory course to the Summer Pre-Law Series. Topics include role of courts and lawyers in society, basic judicial process, and pre-law advising. Conducted via Ecampus blackboard portal. Students taking PS 126 should plan to enroll in PS 321, PHL 321, WR 329. Graded P/N. **PREREQS:** PS 321* and PHL 321* and WR 329*

PS 201. *INTRODUCTION TO UNITED STATES GOVERNMENT AND POLITICS (4). Description and analysis of American politics and government, including such topics as interest groups, parties, elections, media, the presidency, Congress, the Constitution, and the courts. (SS) (Bacc Core Course)

PS 204. *INTRODUCTION TO COMPARATIVE POLITICS (4). Major concepts of comparative politics applied to various political settings; the United States, Western Europe, Communist regimes, and developing countries. (SS) (Bacc Core Course)

PS 205. *INTRODUCTION TO INTERNATIONAL RELATIONS (4). Analysis of the international system and factors affecting world politics. (SS) (Bacc Core Course)

PS 205H. *INTRODUCTION TO INTERNATIONAL RELATIONS (4). Analysis of the international system and factors affecting world politics. (SS) (Bacc Core Course) **PREREQS:** Honors College approval required.

PS 206. *INTRODUCTION TO POLITICAL THOUGHT (4). Introduction to political philosophy. Major ideas and issues of selected political thinkers. (H) (Bacc Core Course)

PS 299. SPECIAL STUDIES (1-4). This course is repeatable for a maximum of 4 credits. **PREREQS:** Departmental approval required.

PS 300. ^POLITICAL ANALYSIS (4). Qualitative and quantitative approaches to the study of political phenomena. The role of values, theory, hypothesis, data collection, and analysis in evaluating and conducting political science research. (Writing Intensive Course) **PREREQS:** (PS 201 and PS 204 and (PS 205 or PS 206))

PS 317. GENDER AND POLITICS (4). Analyzes the role that gender plays in shaping politics and other aspects of society. The course will cover theories of gender difference, gender-based movements, gender and political office, and gender and public policy. (SS) **PREREQS:** PS 201 or PS 204

PS 321. AMERICAN CONSTITUTIONAL LAW (4). The Supreme Court's work from 1789 to 1876; origins of judicial power, issues of federalism, contracts clause, status of blacks, women, and Native Americans. (PS 321, PS 322, and PS 323 form a sequence, though each course may be taken independently.) **PREREQS:** PS 201

PS 322. AMERICAN CONSTITUTIONAL LAW (4). The Supreme Court's work from 1876-1948; economic substantive due process, judicial formalism, incorporation doctrine, rise

of administrative state, beginnings of Second Reconstruction. **PREREQS:** PS 201

PS 323. AMERICAN CONSTITUTIONAL LAW (4). The Supreme Court's work from 1950 to the present; status of women and racial minorities, freedom of expression versus social order, defendant's rights versus crime control, privacy issues, equal protection doctrine. **PREREQS:** PS 201

PS 326. JUDICIAL PROCESS AND POLITICS (4). Study of the operation, processes, behavior and influence of the state and federal judiciaries, as well as current research in the judiciary as it relates to politics.

PS 331. STATE AND LOCAL GOVERNMENT AND POLITICS (4). Role, organization, and functions of government at the state and local level. Satisfies teaching certification requirement for course work in state and local government.

PS 340. EASTERN AND CENTRAL EUROPEAN POLITICS (4). Analyzes domestic and international politics in Central and Eastern Europe, focusing on the period since WW II. Particular attention will be paid to the establishment and dissolution of the Soviet bloc; the interplay of Soviet foreign policy and domestic politics in the various states; and comparisons of domestic political structures, especially since 1989. **PREREQS:** PS 204

PS 341. POLITICS OF WESTERN EUROPE AND THE EUROPEAN UNION (4). Describes and analyzes the political situation in Europe and the European Union. Special focus is given to issues concerning European security and the European Union, its institutions, politics, and the challenges it faces since the opening of Europe to the East. **PREREQS:** PS 204

PS 343. *RUSSIAN POLITICS (4). Brief survey of Russian politics in Tsarist and Soviet periods followed by extensive analysis of Russian politics in the late Soviet period under Gorbachev (1985-91), the collapse of the USSR in 1991, and post-Soviet Russian politics (1992-present). (Bacc Core Course) **PREREQS:** PS 204

PS 344. LATIN AMERICAN POLITICS (4). Exploration of the region's political culture and of the forces contending for maintenance of the status quo, for reform, and for revolution. **PREREQS:** PS 204

PS 345. *THE POLITICS OF DEVELOPING NATIONS (4). Analyzes the concepts of development and modernization. Also focuses on the economic, political, and cultural problems faced by developing nations. (NC) (Bacc Core Course) **PREREQS:** PS 204

PS 348. CHINESE POLITICS (4). Examines China's post-1949 political and economic development. Special attention is given to the reform era from the late 1970s to the present. The course also addresses the impact of the reforms on society and on the country's relationship with the world. (NC) **PREREQS:** PS 204

PS 350. GOVERNMENT AND POLITICS OF MODERN JAPAN (4). Examination of the Japanese political system during the postwar period. Topics include prewar historical influences, political parties, bureaucracy, interest groups, policy processes and issues, political economy, foreign policy, and United States-Japan relations. Attention will also be given to recent dramatic changes in Japan's political system.

PS 351. AMERICAN FOREIGN POLICY (4). Overview of the role of the United States in the world since World War II and of the factors influencing the formation of American foreign policy. **PREREQS:** PS 201 or PS 205

PS 361. CLASSICAL POLITICAL THOUGHT (4). Major political theorists from the pre-Socratics through the Scholastics. (H) **PREREQS:** PS 206

PS 362. MODERN POLITICAL THOUGHT (4). Major political theorists from the Renaissance to the mid-nineteenth century. (H) **PREREQS:** PS 206

PS 363. *GENDER AND RACE IN AMERICAN POLITICAL THOUGHT (4). Traditional canon of American political thought scrutinized from vantage point of feminist and critical race theory scholarship. (Bacc Core Course)

PS 365. AMERICAN POLITICAL THOUGHT (4). Political values and theoretical systems in the American tradition, from the Puritans to the present. **PREREQS:** PS 201 and PS 206

PS 370. *SCIENCE, RELIGION, AND POLITICS (4). Addresses historical interplay between religion and science in Western culture, then focuses on the perceived conflicts between science and religion within American socio-political context; illustrates role of politics as the "playing field" on which social differences contend; requires students to grapple with viewpoints that differ from their own. Team taught. (Bacc Core Course)

PS 371. PUBLIC POLICY PROBLEMS (4). The content and the politics of adoption and application of such policy areas as defense, poverty and welfare, macroeconomics, and regulation. **PREREQS:** PS 201

PS 375. *THE CIVIL RIGHTS MOVEMENT AND POLICIES (4). Political and social evolution of the civil rights movement, emphasizing events 1954-1965, and major contemporary civil rights politics and policies in the South and the nation. (Bacc Core Course) **PREREQS:** PS 201

PS 399. CURRENT PROBLEMS IN POLITICS (1-4). Selected issues of recent American and international concern such as Vietnam, Central America, or similar topical issues. May be repeated for credit when topic varies. This course is repeatable for a maximum of 16 credits.

PS 399H. CURRENT PROBLEMS IN POLITICS (1-4). Selected issues of recent American and international concern such as Vietnam, Central America, or similar topical issues. May be repeated for credit when topic varies. This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

PS 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PS 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PS 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PS 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PS 405H. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

PS 406. PROJECTS (1-16). Section 1-5: Reading. Associated with the internship for which credit is given in PS 410. Section 11: MU Field Training, 3 credits. Section 12: ASOSU Field Training, 3 credits. Completion of this course is required to receive credit for PS 410. Each section graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required. **COREQS:** PS 410

PS 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PS 407H. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required, Honors College approval required.

PS 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PS 409. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PS 410. POLITICAL SCIENCE INTERNSHIP (1-12). Supervised work experience in government- or law-related programs or other public affairs organizations. Reports and appraisals required. Only 4 credits may be applied to the major. This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required. Concurrent enrollment in either PS 406 or PS 506, Sections 1-5, is required.

PS 411. LEGISLATIVE POLITICS (4). Congressional (and state legislative) politics, both on Capitol Hill and in the district, including campaigns, constituent relations, lobbying, legislating, and the legislature in democratic theory. **PREREQS:** PS 201

PS 412. PRESIDENTIAL POLITICS (4). Office, powers, and politics of the American presidency, with reference to other executive offices in American government; emphasis on the importance and effect of the presidency in American politics. **PREREQS:** PS 201

PS 413. POLITICAL PARTIES AND ELECTIONS (4). Political parties and elections, the electorate and voting behavior, electoral system, exercise of the suffrage, extent and consequences of voter participation. **PREREQS:** PS 201

PS 414. INTEREST GROUPS (4). Interest group formation, resources, strategies, and internal struggles, as well as group influence on elections and politics, in government and policy making, and in relation to democratic theory. **PREREQS:** PS 201

PS 415. POLITICS AND THE MEDIA (4). Examination of the methods of operation, content and effects of the media in relation to politics and government. Includes analysis of newspaper, radio and television, political advertising, and other forms of political communication. **PREREQS:** PS 201

PS 416. PUBLIC OPINION AND POLITICS (4). Examination of methods of study, formation, and content of public opinion and of its effect on elections and politics, government operations, and public policy, primarily in the United States. **PREREQS:** PS 201

PS 419. ^TOPICS IN AMERICAN POLITICS (4). Topics in American politics not covered in other courses. May be repeated for credit when topic varies. (Writing Intensive Course) This course is repeatable for a maximum of 16 credits. **PREREQS:** PS 201 and at least one upper-division course in American politics.

PS 424. ADMINISTRATIVE LAW (4). Origins of administrative state; elements of administrative law; assessment of judicial control of bureaucracy. **PREREQS:** PS 201 and at least one of PS 321 or PS 322 or PS 323

PS 425. *GENDER AND THE LAW (4). Legal status of American women, with emphasis on constitutional law, the 1964 Civil Rights Act and its amendments, and various state laws as they relate to the legal rights of women. (Bacc Core Course) **PREREQS:** PS 201 or PS 326

PS 425H. *GENDER AND THE LAW (4). Legal status of American women, with emphasis on constitutional law, the 1964 Civil Rights Act and its amendments, and various state laws as they relate to the legal rights of women. (Bacc Core Course) **PREREQS:** PS 201 or PS 326 and Honors College approval required

PS 429. ^TOPICS IN JUDICIAL POLITICS (4). Topics in judicial politics not covered in other courses. May be repeated for credit when topic varies. (Writing Intensive Course) This course is repeatable for a maximum of 8 credits. **PREREQS:** PS 201

PS 446. EAST ASIAN POLITICAL ECONOMY (4). Surveys and analyzes the economic and political development of China, Japan, South Korea, Taiwan, Hong Kong, and Singapore. Japan is examined as a developmental model for the East Asian Newly Industrializing Countries (NICs) and as a major player in the regional economy. China is examined as a contrasting model in terms of its changing pattern of economic development and its importance for the region. **PREREQS:** PS 204

PS 449. ^TOPICS IN COMPARATIVE POLITICS (4). Topics in comparative politics not covered in other courses. May be repeated for credit when topic varies. (Writing Intensive Course) This course is repeatable for a maximum of 16 credits. **PREREQS:** At least one upper-division course in comparative politics.

PS 451. AMERICAN FOREIGN POLICY (4). Overview of the role of the United States in the world since World War II and of the factors influencing the formation of our foreign policy. **PREREQS:** PS 201 or PS 205

PS 452. ALTERNATIVE INTERNATIONAL FUTURES (4). Search for long-term goals, policies, and institutions that can influence the building of bridges between the present and a more sustainable future. **PREREQS:** PS 205

PS 454. INTERNATIONAL LAW AND ORGANIZATIONS (4). Theories and historical development of international law and organizations; the United Nations system. **PREREQS:** PS 204 or PS 205

PS 455. THE POLITICS OF CLIMATE CHANGE (4). Covers domestic and international political aspects of global climate change. Topics include local, state, and national activity as well as roles played by presidents, Congress, the Supreme Court, corporations and media. International focus on conventions and treaties, tensions between developed and developing nations and possible national security impacts.

PS 456. INTERNATIONAL POLITICS OF ASIA PACIFIC (4). Examines the most pressing issues facing the region: security and regional economic integration. The major players, their interests, and their differing perspectives on regional issues will be analyzed. **PREREQS:** PS 205

PS 457. US-CHINA RELATIONS (4). Historical evolution of US-China relationship. Emphasis on economic ties, tensions, and conflicts surrounding trade, investment, security, human rights, political reform, Tibet, and Taiwan. **PREREQS:** PS 205

PS 458. INTERNATIONAL POLITICAL ECONOMY (4). Examines topics in which politics and economics meet in the international arena, such as trade, debt, finance, development, multinational corporations, and globalization. Does not require a background in economics.

PS 459. ^TOPICS IN INTERNATIONAL RELATIONS (4). Topics in international relations not covered in other courses. May be repeated for credit when topic varies. (Writing Intensive Course) This course is repeatable for a maximum of 16 credits. **PREREQS:** PS 205 and at least one upper-division course in international relations.

PS 461. ENVIRONMENTAL POLITICAL THEORY (4). Examines the ways in which political theory enhances our understanding of environmental issues. Focuses on the political and philosophical premises of various environmental perspectives, and how different theories of justice and democracy address issues such as environmental racism, ecological justice, and global climate change.

PS 462. THEORIES OF LAW (4). Covers some of the main theories and approaches to the nature of law. What is law? What is its relation, if any, to morality? What is it that judges do? Questions such as these are explored through reading some of the classic works on the topic.

PS 469. ^TOPICS IN POLITICAL PHILOSOPHY (4). Topics in political philosophy not covered in other courses. May be repeated for credit when topic varies. (Writing Intensive Course) This course is repeatable for a maximum of 16 credits. **PREREQS:** At least one upper-division course in political philosophy.

PS 473. US ENERGY POLICY (4). Addresses US energy policy with respect to how the U.S. governs the production and use of different energy sources, along with the management of its energy infrastructure. Examines policies currently in place, as well as proposals for alternatives, while examining the economic, environmental, national security and energy security implications of different policy approaches.

PS 474. NATURAL RESOURCE POLICY AND BUREAUCRATIC POLITICS (4). Investigates relations between natural resource policies, such as the Endangered Species Act or the National Forest Management Act and agencies responsible for administering them, such as the National Marine Fisheries Service or U.S. Forest Service. Organizational culture and conflicts, external support and opposition, relations with interested groups and elected officials, state and local agencies, the press, and public pressures are discussed. **PREREQS:** PS 201 or 6 credits of upper-division natural resource or related course work or instructor approval required.

PS 475. ENVIRONMENTAL POLITICS AND POLICY (4). Environmental and natural resource issues and policies in national and regional context, emphasizing public attitudes, elections, Congress, public policy, and relevant national and state agencies. **PREREQS:** PS 201 or instructor approval required.

PS 476. *SCIENCE AND POLITICS (4). Relationship between science and the political system in political ideas and history, in bureaucratic politics of science policy, and in contemporary scientific disputes. (Bacc Core Course) **PREREQS:** PS 201 or 6 credits of lower-division courses in political science or instructor approval required.

PS 477. INTERNATIONAL ENVIRONMENTAL POLITICS AND POLICY (4). Analysis of international environmental theory and politics, the development of international environmental regimes, agreements and treaties, and the process of globalization and the quality of the environment.

PS 479. TOPICS IN PUBLIC POLICY AND PUBLIC ADMINISTRATION (4). Topics in public policy or public administration not covered in other courses. May be repeated for credit when topic varies. This course is repeatable for a maximum of 12 credits. **PREREQS:** PS 201 and at least one upper-division course in public policy or public administration.

PS 499. SPECIAL TOPICS (1-16). Selected topics in political science of special or current interest not covered in other courses. May be repeated for credit when topic varies. This course is repeatable for a maximum of 99 credits. **PREREQS:** At least one lower-division political science course.

PS 501. RESEARCH AND SCHOLARSHIP (1-16). Independent research project under supervision of graduate faculty. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PS 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PS 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

PS 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PS 506. PROJECTS (1-16). Section 1-5: Reading. Associated with the internship for which credit is given in PS 410. Completion of this course is required to receive credit for PS 410. Section 11: MU Field Training, 3 credits. Section 12: ASOSU Field Training, 3 credits, each graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required. **COREQS:** PS 510

PS 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PS 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PS 509. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PS 510. POLITICAL SCIENCE INTERNSHIP (1-12). Supervised work experience in government- or law-related programs or other public affairs organizations. Reports and appraisals required. This course is repeatable for a maximum of 12 credits. **PREREQS:** Departmental approval required.

PS 511. LEGISLATIVE POLITICS (4). Congressional (and state legislative) politics, both on Capitol Hill and in the district, including campaigns, constituent relations, lobbying, legislating, and the legislature in democratic theory. **PREREQS:** PS 201

PS 512. PRESIDENTIAL POLITICS (4). Office, powers, and politics of the American presidency, with reference to other executive offices in American government; emphasis on the importance and effect of the presidency in American politics. **PREREQS:** PS 201

PS 513. POLITICAL PARTIES AND ELECTIONS (4). Political parties and elections, the electorate and voting behavior, electoral system, exercise of the suffrage, extent and consequences of voter participation. **PREREQS:** PS 201

PS 514. INTEREST GROUPS (4). Interest group formation, resources, strategies, and internal struggles, as well as group influence on elections and politics, in government and policy making, and in relation to democratic theory. **PREREQS:** PS 201

PS 515. POLITICS AND THE MEDIA (4). Examination of the methods of operation, content and effects of the media in relation to politics and government. Includes analysis of newspaper, radio and television, political advertising, and other forms of political communication. **PREREQS:** PS 201

PS 516. PUBLIC OPINION AND POLITICS (4). Examination of methods of study, formation, and content of public opinion and of its effect on elections and politics, government operations, and public policy, primarily in the United States. **PREREQS:** PS 201

PS 519. TOPICS IN AMERICAN POLITICS (1-4). Topics in American politics not covered in other courses. May be repeated for credit when topic varies. This course is repeatable for a maximum of 16 credits. **PREREQS:** PS 201 and at least one upper-division course in American politics.

PS 523. AMERICAN CONSTITUTIONAL LAW (4). Examines constitutional law with a heavy emphasis on the practices and procedures of the criminal justice system. Pays particular attention to the rights of the criminally accused; how these rights have changed over time; and the role of politics in the decisions of the Supreme Court.

PS 524. ADMINISTRATIVE LAW (4). Origins of administrative state; elements of administrative law; assessment of judicial control of bureaucracy. **PREREQS:** PS 201 and at least one of PS 321 or PS 322 or PS 323

PS 525. GENDER AND THE LAW (4). Legal status of American women, with emphasis on constitutional law, the 1964 Civil Rights Act and its amendments, and various state laws as they relate to the legal rights of women. **PREREQS:** PS 201 or PS 326

PS 529. TOPICS IN JUDICIAL POLITICS (1-4). Topics in judicial politics not covered in other courses. May be repeated for credit when topic varies. This course is repeatable for a maximum of 8 credits. **PREREQS:** PS 201 and at least one of PS 321 or PS 322 or PS 323

PS 546. EAST ASIAN POLITICAL ECONOMY (4). Surveys and analyzes the economic and political development of China, Japan, South Korea, Taiwan, Hong Kong, and Singapore. Japan is examined as a developmental model for the East Asian Newly Industrializing Countries (NICs) and as a major player in the regional economy. China is examined as a contrasting model in terms of its changing pattern of economic development and its importance for the region. **PREREQS:** PS 204

PS 549. TOPICS IN COMPARATIVE POLITICS (4). Topics in comparative politics not covered in other courses. May be repeated for credit when topic varies. This course is repeatable for a maximum of 16 credits. **PREREQS:** At least one upper-division course in comparative politics.

PS 552. ALTERNATIVE INTERNATIONAL FUTURES (4). Search for long-term goals, policies, and institutions that can influence the building of bridges between the present and a more sustainable future. **PREREQS:** PS 205

PS 554. INTERNATIONAL LAW AND ORGANIZATIONS (4). Theories and historical development of international law and organizations; the United Nations system. **PREREQS:** PS 204 or PS 205

PS 555. THE POLITICS OF CLIMATE CHANGE (4). Covers domestic and international political aspects of global climate change. Topics include local, state, and national activity as well as roles played by presidents, Congress, the Supreme Court, corporations and media. International focus on conventions and treaties, tensions between developed and developing nations and possible national security impacts.

PS 556. INTERNATIONAL POLITICS OF ASIA PACIFIC (4). Examines the most pressing issues facing the region: security and regional economic integration. The major players, their interests, and their differing perspectives on regional issues will be analyzed. **PREREQS:** PS 205

PS 557. US-CHINA RELATIONS (4). Historical evolution of US-China relationship. Emphasis on economic ties, tensions, and conflicts surrounding trade, investment, security, human rights, political reform, Tibet, and Taiwan. **PREREQS:** PS 205

PS 558. INTERNATIONAL POLITICAL ECONOMY (4). Examines topics in which politics and economics meet in the international arena, such as trade, debt, finance, development, multinational corporations, and globalization. Does not require a background in economics.

PS 559. TOPICS IN INTERNATIONAL RELATIONS (4). Topics in international relations not covered in other courses. May be repeated for credit when topic varies. This course is repeatable for a maximum of 16 credits. **PREREQS:** PS 205 and at least one upper-division course in international relations.

PS 561. ENVIRONMENTAL POLITICAL THEORY (4). Examines the ways in which political theory enhances our understanding of environmental issues. Focuses on the political and philosophical premises of various environmental perspectives, and how different theories of justice and democracy address issues such as environmental racism, ecological justice, and global climate change.

PS 562. THEORIES OF LAW (4). Covers some of the main theories and approaches to the nature of law. What is law? What is its relation, if any, to morality? What is it that judges do? Questions such as these are explored through reading some of the classic works on the topic.

PS 569. TOPICS IN POLITICAL PHILOSOPHY (4). Topics in political philosophy not covered in other courses. May be repeated for credit when topic varies. This course is repeatable for a maximum of 16 credits. **PREREQS:** At least one upper-division course in political philosophy.

PS 571. PUBLIC POLICY THEORY (4). Theoretical approaches to the study of the policy process, policy elements, policy tools, (e.g., regulation), and policy typologies. **PREREQS:** Departmental approval required.

PS 572. PUBLIC ADMINISTRATION (4). Principles of public administration, administrative organization and procedures, public relations. **PREREQS:** PS 201

PS 573. US ENERGY POLICY (4). Addresses US energy policy with respect to how the U.S. governs the production and use of different energy sources, along with the management of its energy infrastructure. Examines policies currently in place, as well as proposals for alternatives, while examining the economic, environmental, national security and energy security implications of different policy approaches.

PS 574. NATURAL RESOURCE POLICY AND BUREAUCRATIC POLITICS (4). Investigates relations between natural resource policies, such as the Endangered Species Act or the National Forest Management Act and agencies responsible for administering them, such as the National Marine Fisheries Service or U.S. Forest Service. Organizational culture and conflicts, external support and opposition, relations with interested groups and elected officials, state and local agencies, the press, and public pressures are discussed. **PREREQS:** PS 201 or 6 credits of upper-division natural resource or related course work or instructor approval required.

PS 575. ENVIRONMENTAL POLITICS AND POLICY (4). Environmental and natural resource issues and policies in national and regional context, emphasizing public attitudes, elections, Congress, public policy, and relevant national and state agencies. **PREREQS:** PS 201 or instructor approval required.

PS 576. SCIENCE AND POLITICS (4). Relationship between science and the political system in political ideas and history, in bureaucratic politics of science policy, and in contemporary scientific disputes. **PREREQS:** PS 201 or 6 credits of lower-division courses in political science or instructor approval required.

PS 577. INTERNATIONAL ENVIRONMENTAL POLITICS AND POLICY (4). Analysis of international environmental theory and politics, the development of international environmental regimes, agreements and treaties, and the process of globalization and the quality of the environment.

PS 579. TOPICS IN PUBLIC POLICY AND PUBLIC ADMINISTRATION (4). Topics in public policy or public administration not covered in other courses. May be repeated for credit when topic varies. This course is repeatable for a maximum of 12 credits. **PREREQS:** PS 201 and at least one upper-division course in public policy or public administration.

PS 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PS 808. WORKSHOP (4). Principles of public administration, administrative organization and procedures, public relations. It will include collaborative governance, leadership, and other issues.

■ SOCIOLOGY COURSES

SOC 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

SOC 204. *INTRODUCTION TO SOCIOLOGY (3). Development and application of sociological concepts and perspectives concerning human groups; includes attention to socialization, culture, organization, stratification, and societies. Consideration of fundamental concepts and research methodology. (SS) (Bacc Core Course)

SOC 204H. *INTRODUCTION TO SOCIOLOGY (3). Development and application of sociological concepts and perspectives concerning human groups, includes attention to socialization, culture, organization, stratification, and societies. Consideration of fundamental concepts and research methodology. (SS) (Bacc Core Course) **PREREQS:** Honors College approval required.

SOC 205. *INSTITUTIONS AND SOCIAL CHANGE (3). Sociological study of the dynamic organizational nature of society through analysis of social change and major social institutions such as family, education, religion, the economy, and political systems. (SS) (Bacc Core Course)

SOC 206. *SOCIAL PROBLEMS AND ISSUES (3). Examination of social problems with particular focus upon U.S. society. Sociological perspectives on definition, description, and analysis of contemporary and recurrent problems in industrialized societies. Investigation of causes and consequences of social problems considered in societal context. (SS) (Bacc Core Course)

SOC 241. INTRODUCTION TO CRIME AND JUSTICE (3). Provides a sociological understanding of criminal justice system institutions and processes. Emphasis is placed on understanding the criminal law; police and policing; courts and the prosecution process; and prisons, jails and corrections.

SOC 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

SOC 312. *SOCIOLOGY OF THE FAMILY (4). Survey of the family as a social institution. Addresses historical and cultural perspectives with emphasis on family diversity, variations in family form and life style, interdependence between family and other institutions, analysis of major family issues, forces for change in the family. (Bacc Core Course) **PREREQS:** (SOC 204 or SOC 204H)

SOC 312H. *SOCIOLOGY OF THE FAMILY (4). Survey of the family as a social institution. Addresses historical and cultural perspectives with emphasis on family diversity, variations in family form and life style, interdependence between family and other institutions, analysis of major family issues, forces for change in the family. (Bacc Core Course) **PREREQS:** (SOC 204 or SOC 204H) and Honors College approval required.

SOC 315. ^METHODS I: RESEARCH DESIGN (4). First in a two-course sequence required of all sociology majors. Students learn to formulate researchable questions, devise measures, select data collection techniques, and examine ethical and practical dilemmas in constructing sociological research. (Writing Intensive Course) **PREREQS:** (SOC 204 or SOC 204H) and junior standing. Sociology majors only.

SOC 316. METHODS II: QUANTITATIVE ANALYSIS (4). Second in a two-course sequence required of all sociology majors. The primary objective is to provide students with the statistical skills necessary to analyze sociological data. Covers the construction and interpretation of contingency tables, basic ideas of probability and statistical inference, and an introduction to correlation and regression. **PREREQS:** ((SOC 204 or SOC 204H) and SOC 315) and junior standing. Sociology majors only.

SOC 340. DEVIANT BEHAVIOR AND SOCIAL CONTROL (4). Current perspectives, research and theories of deviant behavior. Review and analysis of various approaches and programs designed to prevent and deal with deviant behavior. **PREREQS:** (SOC 204 or SOC 204H)

SOC 350. HEALTH, ILLNESS AND SOCIETY (4). Social and cultural factors in the identification, course, and treatment of illness; analysis of selected health settings and professions. **PREREQS:** (SOC 204 or SOC 204H)

SOC 355. DEATH AND DYING (4). An overview of cross-cultural and historical attitudes and practices around end of life, death and dying. Assessment of contemporary legal, professional, cultural and technological issues surrounding end of life/death and dying. **PREREQS:** (SOC 204 or SOC 204H)

SOC 360. *POPULATION TRENDS AND POLICY (4). Basic socio-demographic factors affecting population size, distribution, composition and change; examination of local, national, and international trends, and demographic policy. (Bacc Core Course) **PREREQS:** (SOC 204 or SOC 204H)

SOC 399. SPECIAL TOPICS (1-16). Selected topics of special or current interest not covered in other courses. This course is repeatable for a maximum of 16 credits. **PREREQS:** (SOC 204 or SOC 204H)

SOC 399H. SPECIAL TOPICS (1-16). Selected topics of special or current interest not covered in other courses. This course is repeatable for a maximum of 16 credits. **PREREQS:** (SOC 204 or SOC 204H) and Honors College approval required.

SOC 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

SOC 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Department approval required.

SOC 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

SOC 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

SOC 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** (SOC 204 or SOC 204H)

SOC 410. INTERNSHIP PRACTICUM (1-16). Graded P/N. This course is repeatable for a maximum of 30 credits. **PREREQS:** Departmental approval required.

SOC 412. SOCIOLOGY OF WORK AND FAMILY (4). Survey of the intersections between families and work; variations in family structure, policies and paid and unpaid work in the United States; interdependence between paid and unpaid family labor and broader social change.

SOC 413. SOCIOLOGICAL THEORY (4). Historical and philosophical foundations of sociological theory; major schools of thought and their major contributors. **PREREQS:** (SOC 204 or SOC 204H)

SOC 418. QUALITATIVE RESEARCH METHODS (4). An introduction to the theory and methods of qualitative research. Students will be exposed to various qualitative research methods through practical field exercises. These include ethnographic field observation, content analysis, interviewing, focus groups and unobtrusive measures. Other commonly used methods of collecting qualitative data are also examined. **PREREQS:** (SOC 204 or SOC 204H)

SOC 421. SOCIAL CHANGE AND MODERNIZATION (3). Major theories of the nature, types, causes and consequences of social change. Political, social, psychological,

and economic dimensions of modernization.
PREREQS: (SOC 204 or SOC 204H)

SOC 422. SOCIOLOGY OF ORGANIZATIONS (4). Introduces sociological thinking about organizations in contemporary society with an emphasis on exploring the range of frameworks used to think about and explain modern organizations; applies knowledge to specific contemporary organizations. **PREREQS:** (SOC 204 or SOC 204H)

SOC 424. SOCIAL PSYCHOLOGY (4). Examines individuals in social context; explores dynamics of interpersonal relationships; evaluates link between self and society, including concepts of role/status/identity. Contemporary research design, problems, and findings pertinent to social psychology. **PREREQS:** (SOC 204 or SOC 204H)

SOC 426. *SOCIAL INEQUALITY (4). Evolution of social inequality in society. Emphasis upon the causes and consequences of inequality in power, privilege, and prestige in human societies, with special attention to the United States. (Bacc Core Course) **PREREQS:** (SOC 204 or SOC 204H)

SOC 430. GENDER AND SOCIETY (4). Examination of nature and consequences of social differentiation and stratification on the basis of sex and gender. Analysis of social position of women and men in society, focusing on their positions in institutional areas such as the family, politics, work and education. Evaluation of theories of biological, psychological, and sociological bases for the behavior and characteristics of women and men. **PREREQS:** (SOC 204 or SOC 204H)

SOC 432. SOCIOLOGY OF AGING (3). Examination of the social significance of age, position and problems of the elderly in society; discusses the societal and individual consequences of an aging population; explores social theories of aging. **PREREQS:** (SOC 204 or SOC 204H)

SOC 437. RACE AND ETHNIC RELATIONS (4). Comparative/international perspective on the social construction of race and ethnicity. Social, economic and political experiences of selected groups in the U.S. and other countries are examined. **PREREQS:** (SOC 204 or SOC 204H)

SOC 438. US IMMIGRATION ISSUES IN THE 21ST CENTURY (4). Provides a critical overview of immigration to the United States from a socio-historic perspective. Examines how successive waves of immigrants have influenced American society from the earliest groups of Europeans in the 19th century to the most recently arriving immigrants from Asia, Latin America and the Caribbean. **PREREQS:** (SOC 204 or SOC 204H)

SOC 439. WELFARE AND SOCIAL SERVICES (4). Analysis of social, political, and economic forces affecting welfare and social service systems, with overview of current programs, policy issues, public opinions, occupational aspects and societal impacts. **PREREQS:** (SOC 204 or SOC 204H)

SOC 440. JUVENILE DELINQUENCY (4). Contemporary research and theories of juvenile delinquency. Review and evaluation of various strategies and programs designed to prevent delinquency or for treatment of delinquents. **PREREQS:** (SOC 204 or SOC 204H)

SOC 441. CRIMINOLOGY AND PENOLOGY (4). Review of sociological perspectives on crime and criminal justice, with emphasis upon North America. Review of crime statistics, types of crime, theories of criminality, corrections programs and prisons, and programs to reduce crime. **PREREQS:** (SOC 204 or SOC 204H)

SOC 442. SOCIOLOGY OF DRUG USE AND ABUSE (4). Emphasizes a sociological understanding of drug use, drug problems and drug policy. In order to understand drug use and abuse it is necessary to understand the chemical properties of the substances at issue, the attributes of the people who use and abuse drugs,

and the norms and characteristics of the society in which the substance use occurs. **PREREQS:** (SOC 204 or SOC 204H)

SOC 444. INSIDE-OUT: PRISONS, COMMUNITIES, AND PREVENTION (4). Course takes place in a state correctional facility, with OSU students learning along side "inside" students from the facility for a full quarter. Course content examines prisons, communities, crime, and prevention from a sociological perspective. All students participate in service-learning projects. **PREREQS:** SOC 204 and junior standing.

SOC 448. LAW AND SOCIETY (4). An introduction to social scientific approaches to law, covering major topics in the area. Topics may include disputing, legal consciousness, social movements and law, punishment, legal actors, and legal institutions. **PREREQS:** (SOC 204 or SOC 204H) with minimum grade of D-.

SOC 450. SOCIOLOGY OF EDUCATION (4). Contemporary perspectives and research on schools, students, teachers and social forces affecting the educational system. Review of comparative and evaluation research on alternative educational strategies and programs. Overview of the literature of educational critics. **PREREQS:** (SOC 204 or SOC 204H)

SOC 452. SOCIOLOGY OF RELIGION (4). Social patterns within U.S. religious groups, relation of religious groups to society, and the methodological problems in studying such groups. **PREREQS:** (SOC 204 or SOC 204H)

SOC 453. SOCIOLOGY OF SPORT (4). Critical analysis of sport. Examines sport socialization; deviance; violence; gender; race/ethnicity; professional sport careers; intercollegiate athletics; marriage/family; and the media. **PREREQS:** (SOC 204 or SOC 204H)

SOC 454. *LEISURE AND CULTURE (4). Examination of the social, cultural, and global significance of leisure activity (in particular, tourism and recreation) from a historical perspective relative to attitudes, values, behaviors, and use of natural resources. (SS) (Bacc Core Course) **PREREQS:** (SOC 204 or SOC 204H)

SOC 456. *SCIENCE AND TECHNOLOGY IN SOCIAL CONTEXT (4). Study of social aspects of science and technology (values, practices, organization, impacts) by analysis of issues revealing their relationship to other social and cultural processes. (Bacc Core Course) **PREREQS:** (SOC 204 or SOC 204H)

SOC 460. THE SOCIOLOGY OF GLOBALIZATION (4). Examines the sociological effect of globalization on Western and non-Western societies. The course focuses on changes in the global economy and how this has influenced the social structure, patterns of change, and mutual influences among societies. (NC) **PREREQS:** (SOC 204 or SOC 204H)

SOC 466. INTERNATIONAL DEVELOPMENT: GENDER ISSUES (4). Examines roles and statuses of women and men throughout the world and differential impact of development on men and women. Evaluates traditional development policies and programs and discusses theories of gender stratification and of modernization. (NC) **PREREQS:** (SOC 204 or SOC 204H)

SOC 470. COLLECTIVE BEHAVIOR (4). Examines current theories; focuses on behavior in crowds and diverse social settings including fads/fashions, ecstatic crowds/miracles, natural/ technological disasters, urban legends, collective delusions/mass hysteria, protest/demonstrations, riots/mobs. **PREREQS:** (SOC 204 or SOC 204H)

SOC 471. SOCIAL MOVEMENTS (4). Introduces core theoretical and methodological issues related to social movements in the US and abroad. Emphasizes social forces giving rise to movements, tactics employed by movements, and impacts of them on society. **PREREQS:** (SOC 204 or SOC 204H)

SOC 472. GIVING AND VOLUNTARISM (4). Examines concepts of donor motivation, giving, charity, voluntarism, philanthropy, and the nonprofit sector through the analysis of gender roles, ethnicity, power, status, and social institutions. **PREREQS:** SOC 204 or SOC 204H and /or instructor approval.

SOC 475. RURAL SOCIOLOGY (4). Helps students understand the rich diversity in rural society, with an emphasis on the interdependencies between urban and rural contexts. Current issues and social problems experienced by rural populations and how sociology is used to understand and address issues affecting rural communities are explored. **PREREQS:** (SOC 204 or SOC 204H)

SOC 480. *ENVIRONMENTAL SOCIOLOGY (4). Explores the evolution of environmental thought, paradigm shifts, and institutional structures associated with environmental concerns, social movements, and social impacts. (Bacc Core Course) **PREREQS:** (SOC 204 or SOC 204H)

SOC 481. *SOCIETY AND NATURAL RESOURCES (4). Explores the complex interrelationships between humans and natural resources, emphasizing how management decisions and organizations are enmeshed in social and cultural contexts. (Bacc Core Course) **PREREQS:** (SOC 204 or SOC 204H)

SOC 485. *CONSENSUS AND NATURAL RESOURCES (3). Students will use a working group approach. They will select a natural resource topic, study the team process and interaction as a method of learning, explore the issue using systems practice, and strive for consensus on solutions to their issue. **CROSSLISTED** as ANS 485/ANS 585, FES 485/FES 585, FS 485/FS 585, FW 485/FW 585. (Bacc Core Course)

SOC 499. SPECIAL TOPICS (1-16). Selected topics of special or current interest not covered in other courses. For advanced undergraduate and graduate students. This course is repeatable for a maximum of 16 credits. **PREREQS:** (SOC 204 or SOC 204H)

SOC 499H. SPECIAL TOPICS (1-16). Selected topics of special or current interest not covered in other courses. For advanced undergraduate and graduate students. This course is repeatable for a maximum of 16 credits. **PREREQS:** (SOC 204 or SOC 204H) and Honors College approval required.

SOC 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

SOC 502. INDEPENDENT STUDY (1-16).

SOC 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

SOC 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

SOC 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

SOC 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

SOC 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

SOC 510. INTERNSHIP (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

SOC 512. SOCIOLOGY OF WORK AND FAMILY (4). Survey of the intersections between families and work; variations in family structure, policies and paid and unpaid work in the United States; interdependence between paid and unpaid family labor and broader social change. **PREREQS:**

SOC 204 or SOC 204H

SOC 513. SOCIOLOGICAL THEORY (4). Historical and philosophical foundations of sociological theory; major school of thought and their major contributors. **PREREQS:** SOC 204 or SOC 204H

SOC 515. UNDERSTANDING SOCIAL RESEARCH (4). Study of basic concepts and principles of qualitative and quantitative social research, including selection of general strategies and specific designs, conceptual and operational measurement, sample selection, data collection, data processing and analysis techniques, interpretation and reporting. Utilizes reports of social research in scholarly journals, popular media, and agency documents. Emphasis on critical evaluation and interpretation. **PREREQS:** Reserved for MPP students only.

SOC 516. CONDUCTING SOCIAL RESEARCH (4). Reviews concepts and principles covered in SOC 415 with emphasis on actual experiences in using techniques of social research and gaining greater depth of knowledge and skill. Assignments involve practicing techniques used in various phases of the research process, including both qualitative field observation and computerized processing and analysis of quantitative information. Individual or group research projects will be required. **PREREQS:** SOC 515 and reserved for MPP students only.

SOC 518. QUALITATIVE RESEARCH METHODS (4). An introduction to the theory and methods of qualitative research. Students will be exposed to various qualitative research methods through practical field exercises. These include ethnographic field observation, content analysis, interviewing, focus groups and unobtrusive measures. Other commonly used methods of collecting qualitative data are also examined. **PREREQS:** SOC 204 or SOC 204H

SOC 519. APPLIED RESEARCH METHODS (4). Application of sociological theory, concepts, and methods. Topics vary but may include program evaluation, social impact assessment, policy analysis, focus group research, survey research, among others. **PREREQS:** SOC 204 or SOC 204H and at least one upper-division course in sociology.

SOC 522. SOCIOLOGY OF ORGANIZATIONS (4). Introduces sociological thinking about organizations in contemporary society with an emphasis on exploring the range of frameworks used to think about and explain modern organizations; applies knowledge to specific contemporary organizations. **PREREQS:** SOC 204 or SOC 204H

SOC 524. SOCIAL PSYCHOLOGY (4). Examines individuals in social context; explores dynamics of interpersonal relationships; evaluates link between self and society, including concepts of role/status/identity. Contemporary research design, problems, and findings pertinent to social psychology. **PREREQS:** SOC 204 or SOC 204H

SOC 526. SOCIAL INEQUALITY (4). Evolution of social inequality in society. Emphasis upon the causes and consequences of inequality in power, privilege, and prestige in human societies, with special attention to the United States. **PREREQS:** SOC 204 or SOC 204H

SOC 530. GENDER AND SOCIETY (4). Examination of nature and consequences of social differentiation and stratification on the basis of sex and gender. Analysis of social position of women and men in society, focusing on their positions in institutional areas such as the family, politics, work and education. Evaluation of theories of biological, psychological, and sociological bases for the behavior and characteristics of women and men. **PREREQS:** SOC 204 or SOC 204H

SOC 532. SOCIOLOGY OF AGING (3). Examination of the social significance of age, position and problems of the elderly in society; discusses the societal and individual

consequences of an aging population; explores social theories of aging. **PREREQS:** SOC 204 or SOC 204H

SOC 537. RACE AND ETHNIC RELATIONS (4). Comparative/international perspective on the social construction of race and ethnicity. Social, economic and political experiences of selected groups in the U.S. and other countries are examined. **PREREQS:** SOC 204 or SOC 204H

SOC 538. US IMMIGRATION ISSUES IN THE 21ST CENTURY (4). Provides a critical overview of immigration to the United States from a socio-historic perspective. Examines how successive waves of immigrants have influenced American society from the earliest groups of Europeans in the 19th century to the most recently arriving immigrants from Asia, Latin America and the Caribbean.

SOC 539. WELFARE AND SOCIAL SERVICES (4). Analysis of social, political, and economic forces affecting welfare and social service systems, with overview of current programs, policy issues, public opinions, occupational aspects and societal impacts. **PREREQS:** SOC 204 or SOC 204H

SOC 540. JUVENILE DELINQUENCY (4). Contemporary research and theories of juvenile delinquency. Review and evaluation of various strategies and programs designed to prevent delinquency or for treatment of delinquents. **PREREQS:** SOC 204 or SOC 204H

SOC 541. CRIMINOLOGY AND PENOLOGY (4). Review of sociological perspectives on crime and criminal justice, with emphasis upon North America. Review of crime statistics, types of crime, theories of criminality, corrections programs and prisons, and programs to reduce crime. **PREREQS:** SOC 204 or SOC 204H

SOC 542. SOCIOLOGY OF DRUG USE AND ABUSE (4). Emphasizes a sociological understanding of drug use, drug problems and drug policy. In order to understand drug use and abuse it is necessary to understand the chemical properties of the substances at issue, the attributes of the people who use and abuse drugs, and the norms and characteristics of the society in which the substance use occurs.

SOC 544. INSIDE-OUT: PRISONS, COMMUNITIES, AND PREVENTION (4). Course takes place in a state correctional facility, with OSU students learning along side "inside" students from the facility for a full quarter. Course content examines prisons, communities, crime, and prevention from a sociological perspective. All students participate in service-learning projects. **PREREQS:** SOC 204 and junior standing.

SOC 548. LAW AND SOCIETY (4). An introduction to social scientific approaches to law, covering major topics in the area. Topics may include disputing, legal consciousness, social movements and law, punishment, legal actors, and legal institutions. **PREREQS:** (SOC 204 or SOC 204H) with minimum grade of D-.

SOC 550. SOCIOLOGY OF EDUCATION (4). Contemporary perspectives and research on schools, students, teachers and social forces affecting the educational system. Review of comparative and evaluation research on alternative educational strategies and programs. Overview of the literature of educational critics. **PREREQS:** SOC 204 or SOC 204H

SOC 552. SOCIOLOGY OF RELIGION (4). Social patterns within U.S. religious groups, relation of religious groups to society, and the methodological problems in studying such groups. **PREREQS:** SOC 204 or SOC 204H

SOC 553. SOCIOLOGY OF SPORT (4). Critical analysis of sport. Examines sport socialization; deviance; violence; gender; race/ethnicity; professional sport careers; intercollegiate athletics; marriage/family; and the media. This course is repeatable for a maximum of 3 credits.

PREREQS: SOC 204 or SOC 204H

SOC 554. LEISURE AND CULTURE (4). Examination of the social, cultural, and global significance of leisure activity (in particular, tourism and recreation) from a historical perspective relative to attitudes, values, behaviors, and use of natural resources. **PREREQS:** SOC 204 or SOC 204H

SOC 556. SCIENCE AND TECHNOLOGY IN SOCIAL CONTEXT (4). Study of social aspects of science and technology (values, practices, organization, impacts) by analysis of issues revealing their relationship to other social and cultural processes. **PREREQS:** SOC 204 or SOC 204H

SOC 560. THE SOCIOLOGY OF GLOBALIZATION (4). Examines the sociological effect of globalization on Western and non-Western societies. The course focuses on changes in the global economy and how this has influenced the social structure, patterns of change, and mutual influences among societies. **PREREQS:** SOC 204 or SOC 204H

SOC 566. INTERNATIONAL DEVELOPMENT: GENDER ISSUES (4). Examines roles and statuses of women and men throughout the world and differential impact of development on men and women. Evaluates traditional development policies and programs and discusses theories of gender stratification and of modernization. **PREREQS:** SOC 204 or SOC 204H

SOC 570. COLLECTIVE BEHAVIOR (4). Examines current theories; focuses on behavior in crowds and diverse social settings including fads/fashions, ecstatic crowds/miracles, natural/technological disasters, urban legends, collective delusions/mass hysteria, protest/demonstrations, riots/mobs. **PREREQS:** SOC 204 or SOC 204H

SOC 571. SOCIAL MOVEMENTS (4). Introduces core theoretical and methodological issues related to social movements in the US and abroad. Emphasizes social forces giving rise to movements, tactics employed by movements, and impacts of them on society. **PREREQS:** SOC 204 or SOC 204H

SOC 572. GIVING AND VOLUNTARISM (4). Examines concepts of donor motivation, giving, charity, voluntarism, philanthropy, and the nonprofit sector through the analysis of gender roles, ethnicity, power, status, and social institutions. **PREREQS:** SOC 204 or SOC 204H or instructor approval.

SOC 575. RURAL SOCIOLOGY (4). Helps students understand the rich diversity in rural society, with an emphasis on the interdependencies between urban and rural contexts. Current issues and social problems experienced by rural populations and how sociology is used to understand and address issues affecting rural communities are explored. **PREREQS:** SOC 204 or SOC 204H

SOC 580. ENVIRONMENTAL SOCIOLOGY (4). Explores the evolution of environmental thought, paradigm shifts, and institutional structures associated with environmental concerns, social movements, and social impacts. **PREREQS:** SOC 204 or SOC 204H

SOC 581. SOCIETY AND NATURAL RESOURCES (4). Explores the complex interrelationships between humans and natural resources, emphasizing how management decisions and organizations are enmeshed in social and cultural contexts. **PREREQS:** SOC 204 or SOC 204H

SOC 585. CONSENSUS AND NATURAL RESOURCES (3). Students will use a working group approach. They will select a natural resource topic, study the team process and interaction as a method of learning, explore the issue using systems practice, and strive for consensus on solutions to their issue. **CROSSLISTED as ANS 485/ANS 585, FES 485/**

FES 585, FS 485/FS 585, FW 485/FW 585.

SOC 599. SPECIAL TOPICS (1-16). Selected topics of special or current interest not covered in other courses. For advanced undergraduate and graduate students. This course is repeatable for a maximum of 16 credits. **PREREQS:** SOC 204 or SOC 204H

SOC 808. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

SCHOOL OF WRITING, LITERATURE AND FILM

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FACULTY

Professors Anderson, Barbour, Ede, Helle, Lewis, Robinson, Sandor, Scribner, Tolar Burton

Associate Professors Betjemann, Davison, Gottlieb, Holmberg, Rodgers, Williams

Assistant Professors Freeman, Jensen, Li, Malewitz, Olson, Passarello, Pflugfelder, Sheehan

Senior Instructors Jameson, Kunert, St. Jacques

Undergraduate Major

English (BA, HBA)

Minors

English

Film Studies

Writing

Undergraduate Certificate

Medical Humanities

Graduate Majors

Creative Writing (MFA)

Graduate Areas of Concentration

Fiction

Poetry

Nonfiction Writing

English (MA, MAIS)

Graduate Areas of Concentration

Literature and Culture

Rhetoric, Writing, and Culture

Graduate Minors

Creative Writing English

The School of Writing, Literature, and Film offers instruction in literary studies, writing (creative, critical, professional/technical), and critical film studies to students in all disciplines who seek the cultural and intellectual values of the humanities and arts, as well as the broadening influence of humanistic studies, creative expression, cultural studies, and writing for the professions. In addition, the school provides courses for those interested in the major or minor in English, especially for those who plan to teach in the elementary, secondary, or college professions, or who plan to pursue graduate work in English, writing, or film. The Writing minor, which is also offered via Ecampus, serves students interested in creative writing and/or writing for the scientific and/or technical and professional fields.

MINOR PROGRAMS

The minor in English allows students to concentrate in the area of the liberal arts and develop the reading and writing skills often demanded by employers. Students taking a minor in English choose from among three areas: general English studies, English literature, and American literature.

The minor in Writing requires a total of 27 credits to be taken as a minimum of 11 credits (3 courses, with at least one at the 300 level) from the following: WR 199, WR 214, WR 222, WR 224, WR 241, WR 323, WR 324, WR 327, WR 341, WR 362, and WR 383 and 12 credits (3 courses) from the following: WR 406, WR 407, WR 408, WR 411, WR 414, WR 416, WR 420, WR 424, WR 441, WR 448, WR 493, WR 495; and one upper-division literature or writing elective.

GRADUATE PROGRAMS

The School of Writing, Literature, and Film offers graduate work leading to a Master of Arts degree in English. The major area of concentration may be in literature and culture, or rhetoric, writing, and culture. The school also offers the Master of Fine Arts degree in Creative Writing. Graduate work in the school may also be applied to Master of Arts in Interdisciplinary Studies (MAIS) degree or to minors in other advanced degree programs.

UNDERGRADUATE MAJORS WITH OPTIONS

ENGLISH (BA, CRED, HBA)

Undergraduate English majors must attain proficiency in a foreign language,

as certified by the School of Language, Culture, and Society, equivalent to that assumed at the end of a second-year language course.

Lower Division

From one of the following sequences, 8 credits:

Survey of British Literature (ENG 204, ENG 205, ENG 206) (4,4,4)

Survey of American Literature (ENG 253, ENG 254) (4,4)

From the following, 12 additional credits (at least 4 credits pre-1800):

Survey of British Literature (ENG 204, ENG 205, ENG 206) (4,4,4)

Survey of American Literature (ENG 253, ENG 254) (4,4)

Literature of Western Civilization (ENG 207, ENG 208) (4,4)

Literatures of the World (ENG 210, ENG 211, ENG 212, ENG 213) (4,4,4,4)

Shakespeare (ENG 201, ENG 202) (4,4)

ENG 200. Library Skills for Literary Study (1)

Upper Division

ENG 345. Introduction to Literary Criticism and Theory (4)

Pre-1800 Literature

(Select a minimum of 2, 8 credits)¹

ENG 417. The English Novel: Defoe Through Scott (4)

ENG 425. Studies in Medieval Literature (4)

ENG 426. Studies in Chaucer (4)

ENG 430. Studies in Early Modern Literature (4)

ENG 433. Studies in the Long Eighteenth Century (4)

ENG 435. Studies in Shakespeare (4)

ENG 490. History of the English Language (4)

Post-1800 Literature

(Select a minimum of 2 courses, 8 credits)¹

ENG 317. *The American Novel: Beginnings to Chopin (4)

ENG 318. *The American Novel: Modernist Period (4)

ENG 319. *The American Novel: Post-World War II (4)

ENG 320. Studies in Page, Stage, and Screen (4)

ENG 355. Continental European Literature: 19th Century (4)

ENG 356. Continental European Literature: 20th/21st Century (4)

ENG 360. *Native American Literature (4)
ENG 362, ENG 362H. *American Women Writers (4)

ENG 374. *Modern Short Story (4)

ENG 418. The English Novel: Victorian Period (4)

ENG 419. The English Novel: 20th Century (4)

ENG 434. Studies in Romanticism (4)

ENG 436. Studies in Victorian Literature (4)

ENG 438. Studies in Modernism (4)

ENG 440. Studies in Modern Irish Literature (4)

ENG 450. Studies in Short Fiction (4)

ENG 457. *Comparative Literature: Colonialism (4)

ENG 458. *Comparative Literature: Postcolonialism (4)

ENG 470. ^Studies in Poetry (4)

ENG 482. Studies in American Literature, Culture, and the Environment (4)
 ENG 485. ^Studies in American Literature (4)
 ENG 495. Language, Technology, and Culture (4)
 FILM 452. ^Studies in Film (4)

Electives

(12 credits upper-division ENG or WR)

WIC Course (3)

Courses taken to satisfy major requirements may not be taken with an S/U grade.

Total=53

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

¹ See advisor for additional pre- and post-1800 courses.

UNDERGRADUATE MINORS

ENGLISH MINOR

The minor in English allows students to concentrate in the area of the liberal arts and develop the reading and writing skills often demanded by employers. There are three options for completing the English minor: General English, the English Literature, and the American Literature.

General English Studies (28)

A. Required sequence. Choose one of the following sequences (12):

ENG 204. *Survey of British Literature: Beginnings to 1660 (4)

ENG 205. *Survey of British Literature: Restoration to Romantic Era (4)

ENG 206. *Survey of British Literature: Victorian Era to 20th Century (4)

OR

ENG 253. *Survey of American Literature: Colonial to 1900 (4)

ENG 254. *Survey of American Literature: 1900 to Present (4)

B. Upper Division (12 credits)

C. One additional upper- or lower-division English OR one upper-level Writing (4)

English Literature Area (28)

A. Lower Division

ENG 204. *Survey of English Literature: Beowulf to Milton (4)

ENG 205. *Survey of British Literature: Restoration to Romantic Era (4)

ENG 206. *Survey of English Literature: Byron to the Present (4)

Choose one course from below:

ENG 201. *Shakespeare (4)

ENG 202. *Shakespeare (4)

ENG 203. *Shakespeare (4)

B. Upper Division

English Literature Courses (12 credits)

American Literature Area (28)

A. Lower Division

ENG 253. *Survey of American Literature: Colonial to 1900 (4)

ENG 254. *Survey of American Literature: 1900 to Present (4)

Choose one course from below:

ENG 221 *African-American Literature (4)

ENG 260 *Literature of American Minorities (4)

ENG 275 *The Bible as Literature (4)

ENG 317 *The American Novel: Beginnings to Chopin (4)

ENG 318 *The American Novel: Modernist Period (4)

ENG 319 *The American Novel: Post World War II (4)

FILM 245 *The New American Cinema (4)

B. Upper Division

Courses in American Literature (12 credits)

Total=28

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

FILM STUDIES MINOR

The Film Studies minor is designed to give students a coherent introduction to film criticism, theory, and history (what those of us in the field call “critical studies”) as well as more specialized and/or advanced classes in film genres, authors (auteurs), and cultural studies.

Film Minor Requirements

- Minimum total credits (including electives): 28
- Minimum total upper-division credits (including electives): 12
- Minimum total credits in FILM classes: 24
- Minimum total upper division credits in FILM classes: 8

To be selected from:

FILM 101. Film Criticism and Theory: The Basics (3)

FILM 110. *Introduction to Film Studies, 1895–1945 (3)

FILM 125. *Introduction to Film Studies, 1945–Present (3)

FILM 220. *Topics in Difference, Power, and Discrimination (4)

FILM 245. *The New American Cinema (4)

FILM 255. *World Cinema Part I: Origins to 1968 (4)

FILM 256. *World Cinema Part II: 1968–Present (4)

FILM 265. *Films for the Future (4)

FILM 301. Advanced Film Criticism and Theory (4)[**Pending submission and approval of a proposal**]

FILM 452. ^Studies in Film (4) (*can be taken two times for up to 8 credits*)

FILM 480. Studies in Literature, Culture and Society (4) [Pending approval 87588]

Any other FILM courses of at least 3 credits

Electives:

Select no fewer than 3 and no more than 6 credits selected from the following:

German

GER 261. *Masterpieces of German Cinema (3)

GER 361. Critical Issues of German Cinema (3)

GER 362. Divided Screen: German Cinema Between 1945 and 1990 (3)

GER 363. Contemporary German Cinema (3)

French

FR 329. *Francophone Cultures in Film (3–9)

Spanish

SPAN 439. ^Topics in Mexican Culture as Evidenced Through Mexican Film (3)

Ethnic Studies

ES 352. *Asian Representation in Hollywood and Independent Cinemas (3)

ES 411. Chicano/as In/On Film (3)

ES 452. *Ethnicity in Film (3)

Women Studies

WGSS 230. *Women in the Movies (3)

WGSS 235. *Women in World Cinema (3)

WGSS 325. *Disney: Gender, Race, Empire (3)

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

WRITING MINOR

Also available via Ecampus.

The Writing minor benefits students who wish to learn about, practice and hone their writing skills, primarily to prepare them for their careers and to increase their qualifications for professional positions in a world where communication skills are ever more needed and revered by employers. Some students with aspirations for graduate, law or medical school studies pursue the Writing minor to better enable themselves to write more proficiently at higher academic levels, where work is more rigorous and written output is expected to be of a very high level. Others engage in the Writing minor for the pure joy of expressing themselves, working with ideas and words, and many publish works in student publications on campus and in external publications. Writing minors may also participate in on-campus and off-campus internships for credit.

The Writing minor requires a minimum of 27 credits, as follows: a minimum of 11 credits from 100-300-level writing courses, plus a minimum of 12 credits from 400-level upper division writing courses, plus one elective upper-division (300/400) 4-credit course in writing or literature.

Part A. A minimum of 11 credits from 100-300-level writing courses. Choose from this list with at least one course at the 300 level:

WR 199. Special Studies (3)

WR 201. *Writing for Media (3)

WR 214. *Writing in Business (3)

WR 222. *English Composition (3)

WR 224. *Introduction to Fiction Writing (3)

WR 241. *Introduction to Poetry Writing (3)

WR 323. *English Composition (3)

WR 324. *Short Story Writing (4)

WR 327. *Technical Writing (3)

WR 329. Writing for Law and Law School (3)

WR 330. *Understanding Grammar (3)

WR 341. *Poetry Writing (4)

WR 362. *Science Writing (3)

WR 383. Food Writing (4)

Part B. A minimum of 12 credits from 400-level upper-division writing courses from the following list:

- ENG 410. Internship (1–16)
 WR 406. Projects (1–16)
 WR 407. Seminar (variable)
 WR 408. Workshop (1–16)
 WR 411. ^The Teaching of Writing (4)
 WR 414. Advertising and Public Relations Writing (4)
 WR 416. Advanced Composition (4)
 WR 420. Studies in Writing (4)
 WR 424. Advanced Fiction Writing (4)
 WR 441. Advanced Poetry Writing (4)
 WR 448. Magazine Article Writing (4)
 WR 449. Critical Reviewing (4)
 WR 493. ^The Rhetorical Tradition and the Teaching of Writing (4)
 WR 495. ^Introduction to Literacy Studies (4)

Part C. One elective upper-division (300/400) 4-credit course in film, literature, or writing, from this list, which does not duplicate any course used in Parts A or B.

Film Electives

- FILM 452. ^Studies in Film (4)

Literature Electives

- ENG 311. ^Studies in British Prose (4)
 ENG 312. ^Studies in British Drama (4)
 ENG 313. ^Studies in British Poetry (4)
 ENG 317. *The American Novel: Beginning to Chopin (4)
 ENG 318. *The American Novel: Modernist Period. (4)
 ENG 319. The American Novel: Post-World War II (4)
 ENG 320. Studies in Page, Stage, and Screen (4)
 ENG 345. Introduction to Literary Criticism and Theory (4)
 ENG 355. Continental European Literature: 19th Century (4)
 ENG 356. Continental European Literature: 20th/21st Century (4)
 ENG 360. *Native American Literature (4)
 ENG 362. *American Women Writers (4)
 ENG 362H. *American Women Writers (4)
 ENG 374. *Modern Short Story (4)
 ENG 386. A Cultural History of American Art and Literature (4)
 ENG 387. A Cultural History of American Art and Literature (4)
 ENG 388. A Cultural History of American Art and Literature (4)
 ENG 412. Studies in British Theater and Society (4)
 ENG 416. *Power and Representation (4)
 ENG 417. The English Novel: Defoe Through Scott (4)
 ENG 418. The English Novel: Victorian Period (4)
 ENG 419. The English Novel: 20th Century (4)
 ENG 420. *Studies in Difference, Power, and Discrimination (4)
 ENG 425. Studies in Medieval Literature (4)
 ENG 426. Studies in Chaucer (4)
 ENG 430. Studies in Early Modern Literature (4)
 ENG 433. Studies in the Long Eighteenth Century (4)

- ENG 434. Studies in Romanticism (4)
 ENG 435. Studies in Shakespeare (4)
 ENG 436. Studies in Victorian Literature (4)
 ENG 438. Studies in Modernism (4)
 ENG 440. Studies in Modern Irish Literature (4)
 ENG 445. ^Studies in Nonfiction (4)
 ENG 450. Studies in Short Fiction (4)
 ENG 454. Major Authors (4)
 ENG 457. *Comparative Literature: Colonialism (4)
 ENG 458. *Comparative Literature: Postcolonialism (4)
 ENG 460. Studies in Drama (4)
 ENG 465. Studies in the Novel (4)
 ENG 470. ^Studies in Poetry (4)
 ENG 475. Studies in Criticism (4)
 ENG 480. Studies in Literature, Culture, and Society (4)
 ENG 482. Studies in American Literature, Culture, and the Environment (4)
 ENG 485. ^Studies in American Literature (4)
 ENG 486. Studies in British Literature (4)
 ENG 488. Literature and Pedagogy (4)
 ENG 489. Writing, Literature, and Medicine (4)
 ENG 490. History of the English Language (4)
 ENG 495. Language, Technology, and Culture (4)
 ENG 497. *International Women's Voices (4)
 ENG 498. Women and Literature (4)
 ENG 499. Selected Topics (1–16)

Writing Electives

- WR 324. *Short Story Writing (4)
 WR 341. *Poetry Writing (4)
 WR 383. Food Writing (4)
 WR 399. Special Topics (1–16)
 WR 399H. Special Topics (1–16)
 WR 401. Research and Scholarship (1–16)
 WR 402. Independent Study (1–16)
 WR 403. Thesis (TBA) (1–16)
 WR 404. Writing and Conference (1–16)
 WR 405. Reading and Conference (1–16)
 WR 406. Projects (1–16)
 WR 407. Seminar (1–16)
 WR 408. Workshop (1–16)
 WR 411. ^The Teaching of Writing (4)
 WR 414. Advertising and Public Relations Writing (4)
 WR 416. Advanced Composition (4)
 WR 420. Studies in Writing (4)
 WR 424. Advanced Fiction Writing (4)
 WR 441. Advanced Poetry Writing (4)
 WR 448. Magazine Article Writing (4)
 WR 449. Critical Reviewing (4)
 WR 462. Science Writing (4)
 WR 493. ^The Rhetorical Traditional and The Teaching of Writing (4)
 WR 495. ^Introduction to Literacy Studies (4)
 WR 499. Special Topics (1–16)

Total—a minimum of 27 credits

Footnotes:

- * Bacc Core Course
 ^ Writing Intensive Course (WIC)

GRADUATE MAJORS

CREATIVE WRITING (MFA)

Graduate Areas of Concentration
Fiction, poetry, nonfiction writing

The School of Writing, Literature, and Film offers the Master of Fine Arts degree in Creative Writing (fiction, poetry, nonfiction writing) at the Corvallis campus and a Low-Residency MFA partner program on the OSU-Cascades campus in Bend, Oregon.

The MFA Program in Creative Writing on the OSU Corvallis campus is a two-year, high residency, studio/research program that interweaves literary artistic practice and literary scholarship. Tracks in fiction, nonfiction, and poetry are supported by writing workshops led by nationally known writers, as well as by courses in form, craft, and theory. Intensive mentoring during the thesis year, training in creative writing pedagogy, professional internships, and opportunities for outreach and community engagement produce graduates who are both accomplished creative writers and advocates for the role of literary arts in American culture and society.

OSU-Cascades's Low-Residency MFA is a two-year program combining writing workshop with studies in craft, literature, and vocation. The program offers intensive 10-day residency sessions in June and October and individualized mentorships by nationally known writers throughout the year. The program's intensive low-residency format is designed to balance the modern writer's need for both solitude and community, for both freedom and responsibility—to give our students the freedom as well as the discipline to write. Our curriculum builds sustainable writing habits, develops skills needed to support a creative livelihood after graduation, and creates an environment for taking imaginative risks.

ENGLISH (MA, MAIS)

Graduate Areas of Concentration
Literature and culture; rhetoric, writing, and culture

The School of Writing, Literature and Film offers graduate work leading to a Master of Arts degree in English. The major area of concentration may be literature and culture; or rhetoric, writing, and culture. Graduate work in the school may also be applied to a Master of Arts in Interdisciplinary Studies degree or to minors in other advanced degree programs.

GRADUATE MINORS

CREATIVE WRITING GRADUATE MINOR

For more details, see the departmental advisor.

ENGLISH GRADUATE MINOR

For more details, see the school advisor.

ENGLISH COURSES

ENG 104. *INTRODUCTION TO LITERATURE: FICTION (3). Study of fiction for greater understanding and enjoyment. (H) (Bacc Core Course)

ENG 104H. *INTRODUCTION TO LITERATURE: FICTION (3). Study of fiction for greater understanding and enjoyment. (H) (Bacc Core Course) **PREREQS:** Honors College approval required.

ENG 105. *INTRODUCTION TO LITERATURE: DRAMA (3). Study of drama for greater understanding and enjoyment. (H) (Bacc Core Course)

ENG 106. *INTRODUCTION TO LITERATURE: POETRY (3). Study of poetry for greater understanding and enjoyment. (H) (Bacc Core Course)

ENG 107. *INTRODUCTION TO CREATIVE NONFICTION (3). An introduction to the study of creative nonfiction as a diverse genre, from journalism to memoir and essay. (Bacc Core Course) **PREREQS:** WR 121 or its equivalent in college credit.

ENG 199. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENG 200. LIBRARY SKILLS FOR LITERARY STUDY (1). Introduction to library resources for the study of literature. Required for English majors.

ENG 201. *SHAKESPEARE (4). The earlier plays. (H) (Bacc Core Course)

ENG 202. *SHAKESPEARE (4). The later plays. (H) (Bacc Core Course)

ENG 204. *SURVEY OF BRITISH LITERATURE: BEGINNINGS TO 1660 (4). English literature presented in chronological sequence. (H) (Bacc Core Course)

ENG 204H. *SURVEY OF BRITISH LITERATURE: BEGINNINGS TO 1660 (4). English literature presented in chronological sequence. (H) (Bacc Core Course) **PREREQS:** Honors College approval required.

ENG 205. *SURVEY OF BRITISH LITERATURE: RESTORATION TO ROMANTIC ERA (4). English literature presented in chronological sequence. (H) (Bacc Core Course)

ENG 206. *SURVEY OF BRITISH LITERATURE: VICTORIAN ERA TO 20TH CENTURY (4). English literature presented in chronological sequence. (H) (Bacc Core Course)

ENG 206H. *SURVEY OF BRITISH LITERATURE: VICTORIAN ERA TO 20TH CENTURY (4). English literature presented in chronological sequence. (H) (Bacc Core Course) **PREREQS:** Honors College approval required.

ENG 207. *LITERATURE OF WESTERN CIVILIZATION: CLASSICAL-RENAISSANCE (4). The great plays, poems and fiction of Western civilization. Covers the Classical World: (Greek, Hebrew, Roman) and Western European major authors through the Renaissance. (H) (Bacc Core Course)

ENG 208. *LITERATURE OF WESTERN CIVILIZATION: 18TH CENTURY TO PRESENT (4). The great plays, poems and prose of Western civilization from the 18th century Enlightenment through Romanticism and beyond. (H) (Bacc Core Course)

ENG 210. *LITERATURES OF THE WORLD: ASIA (4). Representative works of poetry, prose, and drama from nonwestern cultural traditions. Covers literature of Asia. (H) (NC) (Bacc Core Course)

ENG 211. *LITERATURES OF THE WORLD: AFRICA (4). Representative works of poetry, prose, and drama from nonwestern cultural traditions. Covers literature of Africa. (H) (NC) (Bacc Core Course)

ENG 212. *LITERATURES OF THE WORLD: MESO/SOUTH AMERICA, CARIBBEAN (4). Representative works of poetry, prose, and drama from nonwestern cultural traditions. Covers literature of Meso- and South America and the Caribbean. (H) (NC) (Bacc Core Course)

ENG 213. *LITERATURES OF THE WORLD: MIDDLE EAST (4). Representative works of poetry, prose, and drama from nonwestern cultural traditions. Covers literature of the Middle East. (H) (NC) (Bacc Core Course)

ENG 213H. *LITERATURES OF THE WORLD: MIDDLE EAST (4). Representative works of poetry, prose, and drama from nonwestern cultural traditions. Covers literature of the Middle East. (H) (NC) (Bacc Core Course) **PREREQS:** Honors College approval required.

ENG 215. *CLASSICAL MYTHOLOGY (4). Greek and Roman mythology, its allusions, continuing influences. Not offered every year. (H) (Bacc Core Course)

ENG 220. *TOPICS IN DIFFERENCE, POWER, AND DISCRIMINATION (4). A comparative treatment of literary topics in the context of institutional and systematic discrimination. Not offered every year. **CROSSLISTED** as FILM 220. (H) (Bacc Core Course)

ENG 221. *AFRICAN-AMERICAN LITERATURE (4). Reading and critical analysis of African-American literature in historical, political, and/or thematic perspective. Content changes from term to term; see Schedule of Classes. Not offered every year. (H) (Bacc Core Course) This course is repeatable for a maximum of 8 credits.

ENG 253. *SURVEY OF AMERICAN LITERATURE: COLONIAL TO 1900 (4). Readings from American literature presented in chronological sequence, important eras and movements with emphasis on major writers. (H) (Bacc Core Course)

ENG 254. *SURVEY OF AMERICAN LITERATURE: 1900 TO PRESENT (4). Readings from American literature presented in chronological sequence, important eras and movements with emphasis on major writers. (H) (Bacc Core Course)

ENG 254H. *SURVEY OF AMERICAN LITERATURE: 1900 TO PRESENT (4). Readings from American literature presented in chronological sequence, important eras and movements with emphasis on major writers. (H) (Bacc Core Course) **PREREQS:** Honors College approval required.

ENG 260. *LITERATURE OF AMERICAN MINORITIES (4). Study of the literature of American minorities: North American Indian, black, Chicano/Chicana, Asian, Middle Eastern, gay and lesbian. Not offered every year. (H) (Bacc Core Course) **PREREQS:** Sophomore standing.

ENG 260H. *LITERATURE OF AMERICAN MINORITIES (4). Study of the literature of American minorities: North American Indian, black, Chicano/Chicana, Asian, Middle Eastern, gay and lesbian. Not offered every year. (H) (Bacc Core Course) **PREREQS:** Sophomore standing and Honors College approval required.

ENG 275. *THE BIBLE AS LITERATURE (4). Biblical structure, literary types, ideas, influences. Not offered every year. (H) (Bacc Core Course)

ENG 275H. *THE BIBLE AS LITERATURE (4). Biblical structure, literary types, ideas, influences. Not offered every year. (H) (Bacc Core Course) **PREREQS:** Honors College approval required.

ENG 311. ^STUDIES IN BRITISH PROSE (4). An introduction to the prose genre in British literature

with intensive practice in reading and writing practices for literary study. (Writing Intensive Course)

ENG 312. ^STUDIES IN BRITISH DRAMA (4). An introduction to the dramatic arts genre in British literature with a special emphasis in reading and writing for literary study. (Writing Intensive Course)

ENG 313. ^STUDIES IN BRITISH POETRY (4). An introduction to the poetry genre in British literature with intensive practice in reading and writing for literary study. (Writing Intensive Course)

ENG 317. *THE AMERICAN NOVEL: BEGINNINGS TO CHOPIN (4). Chronological survey of the novel in America. Covers from the beginnings to Chopin. (H) (Bacc Core Course)

ENG 318. *THE AMERICAN NOVEL: MODERNIST PERIOD (4). Chronological survey of the novel in America. Covers Modernist Period from Dreiser to Faulkner. (H) (Bacc Core Course)

ENG 319. *THE AMERICAN NOVEL: POST-WORLD WAR II (4). Chronological survey of the novel in America. Covers Post-World War II: Mailer to the present. (H) (Bacc Core Course)

ENG 320. *STUDIES IN PAGE, STAGE, AND SCREEN (4). Study of a particular theme, genre, movement, or author through the relations of text and performance. Topics change from term to term and may include content from film, drama, digital sources, and other visual media. (H) (Bacc Core Course) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing or above.

ENG 321. *STUDIES IN WORD, OBJECT, AND IMAGE (4). Study of a particular theme, genre, movement, or author through the relations of texts to material artifacts and/or static visual objects (e.g. paintings, engravings, printed matter, or photographs). Topics change from term to term. (Bacc Core Course) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing or above.

ENG 322. *STUDIES IN GLOBALISM, TEXT, AND EVENT (4). Study of a particular theme, genre, movement, or author as informed by patterns of globalization, issues in international relations, and/or landmark moments of cultural exchange. Topics change from term to term. (Bacc Core Course) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing.

ENG 330. *THE HOLOCAUST IN LITERATURE AND FILM (4). Study of fiction, memoir, and film representing Nazi Holocaust of European Jewry. Reviews history of racial Anti-Semitism and rise of Nazism as context for textual analysis of Holocaust literature. Examines literary and filmic form as productive to social awareness of the roots, events, and aftermath of the Holocaust. (Bacc Core Course) **PREREQS:** Sophomore standing or above.

ENG 345. INTRODUCTION TO LITERARY CRITICISM AND THEORY (4). Study and analysis of critical frameworks and methodologies for the interpretation of literature and culture. Required for English majors. (H)

ENG 355. CONTINENTAL EUROPEAN LITERATURE: 19TH CENTURY (4). Major continental European works in translation Covers the 19th century. Not offered every year. (H)

ENG 356. CONTINENTAL EUROPEAN LITERATURE: 20TH/21ST CENTURY (4). Major continental European works in translation. Covers 1900 to the present. Not offered every year. (H)

ENG 360. *NATIVE AMERICAN LITERATURE (4). An introduction to the prose and poetry written by Native Americans of the North American continent. Not offered every year. (H) (NC) (Bacc Core Course)

ENG 362. *AMERICAN WOMEN WRITERS (4). Study of important literary works of any genre by American women from historical, thematic, or formalist perspectives. (H) (Bacc Core Course)

ENG 362H. *AMERICAN WOMEN WRITERS (4). Study of important literary works of any genre by American women from historical, thematic, or formalist perspectives. (Bacc Core Course) (H) **PREREQS:** Honors College approval required.

ENG 374. *MODERN SHORT STORY (4). Survey of the short story from the 19th century to the present. Not offered every year. (H) (Bacc Core Course)

ENG 375. CHILDREN'S LITERATURE (4). Surveys a variety of genres, including fairy tales, folktales, and fables, nonsense poetry, picture books, historical and fantasy novels, examining how these texts represent childhood and connect with historical, cultural, and psychological contexts.

ENG 386. A CULTURAL HISTORY OF AMERICAN ART AND LITERATURE: PART I (4). The first course in an interdisciplinary sequence of courses that examines the development and interrelationships of American art and literature from contact to the present. ENG 386 covers Conquest to Civil War. **CROSSLISTED** as ART 386. **PREREQS:** Sophomore standing.

ENG 387. A CULTURAL HISTORY OF AMERICAN ART AND LITERATURE: PART II (4). The second course in an interdisciplinary sequence that examines the development and interrelationships of American art and literature from contact to the present. ENG 387 covers Civil War to Harlem Renaissance. **CROSSLISTED** as ART 387. **PREREQS:** Sophomore standing.

ENG 388. A CULTURAL HISTORY OF AMERICAN ART AND LITERATURE: PART III (4). The third course in an interdisciplinary sequence that examines the development and interrelationships of American art and literature from contact to the present. ENG 388 covers Great Depression to Postmodernity. **CROSSLISTED** as ART 388. **PREREQS:** Sophomore standing.

ENG 399. SELECTED TOPICS (1-16). (H) This course is repeatable for a maximum of 16 credits.

ENG 399H. SELECTED TOPICS (1-16). (H) This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

ENG 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENG 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENG 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENG 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENG 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENG 406H. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

ENG 407. *SEMINAR (1-16). May be repeated as topics vary. **CROSSLISTED** as AMS 407. (Writing Intensive Core) This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENG 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ENG 410. INTERNSHIP IN ENGLISH (1-16). Provides upper-division English majors with supervised, on-the-job work experience, accompanying academic readings. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Junior standing in English; 16 credits of literature; 6 credits of writing beyond WR 121. Departmental approval required.

ENG 412. STUDIES IN BRITISH THEATER AND SOCIETY (4). Study of major dramatists and the audiences they addressed, of socio-economic conditions and their interrelations with theatrical institutions. Readings may include dramatic and non-dramatic literature. Historical period and content may vary. (H) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 416. *POWER AND REPRESENTATION (4). Critical analysis of works by colonized peoples, women, and ethnic minorities, with a focus on the issue of representation. Not offered every year. (H) (Bacc Core Course) **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 417. THE ENGLISH NOVEL: DEFOE THROUGH SCOTT (4). Selected English novels from Defoe through Scott. Not offered every year. (H) **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 418. THE ENGLISH NOVEL: VICTORIAN PERIOD (4). Selected English novels focusing on those from the Victorian period. (H) **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 419. THE ENGLISH NOVEL: 20TH CENTURY (4). Selected English novels of the 20th century. (H) **PREREQS:** Sophomore standing; 8 credits in English at 200-level or above.

ENG 420. *STUDIES IN DIFFERENCE, POWER, AND DISCRIMINATION (4). Comparative studies in literature documenting or illuminating institutional and systematic discrimination. Not offered every year. (H) (Bacc Core Course) **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 425. STUDIES IN MEDIEVAL LITERATURE (4). Particular genres, themes, and writers in medieval literature. Topics change from term to term. (H) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 426. STUDIES IN CHAUCER (4). The works of Geoffrey Chaucer in their historical, cultural, and poetic contexts. Topics change from term to term. (H) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 430. STUDIES IN EARLY MODERN LITERATURE (4). Literature and culture of the Tudor, early Stuart, and Interregnum periods, 1485-1660. Content and genres will vary and may include non-English writers who influenced the English Renaissance. (H) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 433. STUDIES IN THE LONG EIGHTEENTH CENTURY (4). Literature of the period 1660-1800, with emphasis on one or more of the following poets: Dryden, Pope, Swift, Johnson, Gray, Cowper. May also include prose writers (e.g. Behn, Fielding, Richardson, Addison and Steele) and dramatists (e.g. Congreve, Wycherly, Gay). Not offered every term. (H) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 434. STUDIES IN ROMANTICISM (4). Romantic-period writing and culture, with emphasis on one or more of the following authors: Blake, Wordsworth, Coleridge, Keats, Byron and Shelley. May also include Romantic novelists and prose writers (e.g. Austen, Wollstonecraft,

Burke). Not offered every term. (H) This course is repeatable for a maximum of 8 credits.

PREREQS: Sophomore standing; 8 credits of ENG 200-level or above.

ENG 435. STUDIES IN SHAKESPEARE (4). Shakespeare's works from a variety of critical and scholarly perspectives. Not offered every term. (H) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 436. STUDIES IN VICTORIAN LITERATURE (4). Fiction, poetry, and nonfiction prose of the Victorian era. Topics change from term to term; see Schedule of Classes. (H) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 438. STUDIES IN MODERNISM (4). Studies in the literature and contexts of the Modernist period in Anglo-American letters (1890s to 1940s). Authors may include Wilde, Crane, Conrad, Eliot, Stevens, James, Woolf, Joyce, Lawrence, Shaw, Forster. Topics change from term to term. (H) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 440. STUDIES IN MODERN IRISH LITERATURE (4). Studies in the literature and contexts of the period of Irish writing often referred to as the Irish Renaissance. Authors may include Yeats, Joyce, Shaw, O'Casey, Gregory, Synge, Bowen, Moore, Behan, O'Brien, Kavanaugh, Cronin. Sometimes offered as a study of Joyce's works alone. Topics change from term to term. (H) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 445. *STUDIES IN NONFICTION (4). Particular essayists and journalists, movements, problems, conventions, and types of nonfiction writing in English. Topics change from term to term; see Schedule of Classes. Not offered every year. (H) (Writing Intensive Course) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 450. STUDIES IN SHORT FICTION (4). Particular writers, movements, and types of short fiction. Topics change from term to term; see Schedule of Classes. Not offered every year. (H) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 454. MAJOR AUTHORS (4). Advanced study of major and influential authors from various cultures and backgrounds. Subjects change from term to term; see Schedule of Classes. Not offered every year. (H) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 457. *COMPARATIVE LITERATURE: COLONIALISM (4). Major works from Europe and the non-Western world during the colonial era: 1800-1945. Not offered every year. (H) (NC) (Bacc Core Course) **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 458. *COMPARATIVE LITERATURE: POSTCOLONIALISM (4). Major works from Europe and the non-Western world in the postcolonial period: WW II to present. Not offered every year. (H) (NC) (Bacc Core Course) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 460. STUDIES IN DRAMA (4). Particular dramatists, movements, conventions, and types of world drama. Topics change from term to term; see Schedule of Classes. Not offered every term. (H) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 465. STUDIES IN THE NOVEL (4). Particular novelists, movements, conventions, and types of the novel throughout its history. Topics change from term to term; see Schedule of Classes. Not offered every term. (H) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 470. ^STUDIES IN POETRY (4). Particular poets, movements, problems, conventions, and types of poetry in English or English translation. Topics change from term to term; see Schedule of Classes. Not offered every term. (H) (Writing Intensive Course) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 475. STUDIES IN CRITICISM (4). Particular critics, critical movements, issues, and histories of criticism. Topics change from term to term; see Schedule of Classes. Not offered every year. (H) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 480. STUDIES IN LITERATURE, CULTURE AND SOCIETY (4). Study of literature in its relationship to society and culture; study of literary culture. Topics change from term to term; see Schedule of Classes. Not offered every term. (H) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 482. STUDIES IN AMERICAN LITERATURE, CULTURE, AND THE ENVIRONMENT (4). Creative nonfiction, fiction, poetry, and film from the mid-19th century to the present, examining relationships between rural and urban, and investigating the development of important patterns in how the physical environment is perceived, represented, interpreted, and used in the United States. (H) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 485. ^STUDIES IN AMERICAN LITERATURE (4). Special topics in American literary history. Organized around movements, regions, themes, or major authors. Topics change from term to term; see Schedule of Classes. Not offered every term. (H) (Writing Intensive Course) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 486. STUDIES IN BRITISH LITERATURE (4). Particular British writers, movements, conventions, genres, and problems. Topics change from term to term; see Schedule of Classes. Not offered every year. (H) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 488. LITERATURE AND PEDAGOGY (4). Practices, approaches, histories, and theories of teaching literature appropriate for secondary through college settings. Considers text selection, assignments, and evaluation. (H) **PREREQS:** Upper-division standing.

ENG 489. WRITING, LITERATURE AND MEDICINE (4). Considers medical themes in literature, social meanings of illness, and writing strategies appropriate to the healing arts. **PREREQS:** Sophomore and above.

ENG 490. HISTORY OF THE ENGLISH LANGUAGE (4). A study of the origins, changes, and reasons for changes in the grammar, sounds, and vocabulary of English from its earliest stages through its modern forms. (H) **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 495. LANGUAGE, TECHNOLOGY, AND CULTURE (4). Explores relationship between literacy, technology, and thought. (H) **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 497. *INTERNATIONAL WOMEN'S VOICES (4). A study of women and literature in an international context, focusing on the cultural differences among women and the effects of gender on language and literature. (H) (Bacc Core Course) **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 498. WOMEN AND LITERATURE (4). Study of the relations between women and literature, including such issues as images of women in literature, women writers, and the effects of gender on language. This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 499. SELECTED TOPICS (1-16). (H) This course is repeatable for a maximum of 16 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

ENG 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval and graduate standing required.

ENG 502. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval and graduate standing required.

ENG 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval and graduate standing required.

ENG 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval and graduate standing required.

ENG 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval and graduate standing required.

ENG 507. SEMINAR (1-16). May be repeated for credit as topics vary. **CROSSLISTED** as AMS 507. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval and graduate standing required.

ENG 510. GRADUATE INTERNSHIP IN ENGLISH (1-2). Provides graduate students with supervised, on-the-job work experience and professional development. Includes academic readings. Graded P/N. This course is repeatable for a maximum of 4 credits. **PREREQS:** Graduate standing in English, departmental approval.

ENG 512. STUDIES IN BRITISH THEATER AND SOCIETY (4). Study of major dramatists and the audiences they addressed, of socio-economic conditions and their interrelations with theatrical institutions. Readings may include dramatic and non-dramatic literature. Historical period and content may vary. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 514. INTRODUCTION TO GRADUATE STUDIES (4). Introduction to the MA program; theories and methods of English studies. Offered fall term only. Required for first-year MA students.

ENG 516. POWER AND REPRESENTATION (4). Critical analysis of works by colonized peoples, women, and ethnic minorities, with a focus on the issue of representation. Not offered every year. **PREREQS:** Graduate standing.

ENG 517. THE ENGLISH NOVEL: DEFOE THROUGH SCOTT (4). Selected English novels from Defoe through Scott. Not offered every year. **PREREQS:** Graduate standing.

ENG 518. THE ENGLISH NOVEL: VICTORIAN PERIOD (4). Selected English novels focusing on those from the Victorian period. **PREREQS:** Graduate standing.

ENG 519. THE ENGLISH NOVEL: 20TH CENTURY (4). Selected English novels of the 20th century. **PREREQS:** Graduate standing.

ENG 520. STUDIES IN DIFFERENCE, POWER, AND DISCRIMINATION (4). Comparative studies in literature documenting or illuminating institutional and systematic discrimination. Not offered every year. **PREREQS:** Graduate standing.

ENG 525. STUDIES IN MEDIEVAL LITERATURE (4). Particular genres, themes, and writers in medieval literature. Topics change from term to term. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 526. STUDIES IN CHAUCER (4). The works of Geoffrey Chaucer in their historical, cultural, and poetic contexts. Topics change from term to term. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 530. STUDIES IN EARLY MODERN LITERATURE (4). Literature and culture of the Tudor, early Stuart, and Interregnum periods, 1485-1660. Content and genres will vary and may include non-English writers who influenced the English Renaissance. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 533. STUDIES IN THE LONG EIGHTEENTH CENTURY (4). Literature of the period 1660-1800, with emphasis on one or more of the following poets: Dryden, Pope, Swift, Johnson, Gray, Cowper. May also include prose writers (e.g. Behn, Fielding, Richardson, Addison and Steele) and dramatists (e.g. Congreve, Wycherly, Gay). Not offered every term. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 534. STUDIES IN ROMANTICISM (4). Romantic-period writing and culture, with emphasis on one or more of the following authors: Blake, Wordsworth, Coleridge, Keats, Byron and Shelley. May also include Romantic novelists and prose writers (e.g. Austen, Wollstonecraft, Burke). Not offered every term. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 535. STUDIES IN SHAKESPEARE (4). Shakespeare's works from a variety of critical and scholarly perspectives. Not offered every term. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing and at least one quarter of Shakespeare.

ENG 536. STUDIES IN VICTORIAN LITERATURE (4). Fiction, poetry, and nonfiction prose of the Victorian era. Topics change from term to term; see Schedule of Classes. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 538. STUDIES IN MODERNISM (4). Studies in the literature and contexts of the Modernist period in Anglo-American letters (1890's to 1940's). Authors may include Wilde, Crane, Conrad, Eliot, Stevens, James, Woolf, Joyce, Lawrence, Shaw, Forster. Topics change from term to term. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 540. STUDIES IN MODERN IRISH LITERATURE (4). Studies in the literature and context of the period of Irish writing often referred to as the Irish Renaissance. Authors may include Yeats, Joyce, Shaw, O'Casey, Gregory, Synge, Bowen, Moore, Behan, O'Brien, Kavanaugh, Cronin. Sometimes offered as a study of Joyce's works alone. Topics change from term to term. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 545. STUDIES IN NONFICTION (4). Particular essayists and journalists, movements, problems, conventions, and types of nonfiction writing in English. Topics change from term to term; see Schedule of Classes. Not offered every year. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 550. STUDIES IN SHORT FICTION (4). Particular writers, movements, and types of short fiction. Topics change from term to term; see

Schedule of Classes. Not offered every year. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 554. MAJOR AUTHORS (4). Advanced study of major and influential authors from various cultures and backgrounds. Subjects change from term to term; see Schedule of Classes. Not offered every year. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 557. COMPARATIVE LITERATURE: COLONIALISM (4). Major works from Europe and the non-Western world during the colonial era: 1800-1945. Not offered every year. **PREREQS:** Graduate standing.

ENG 558. COMPARATIVE LITERATURE: POSTCOLONIALISM (4). Major works from Europe and the non-Western world in the postcolonial period: WW II to present. Not offered every year. **PREREQS:** Graduate standing.

ENG 560. STUDIES IN DRAMA (4). Particular dramatists, movements, conventions, and types of world drama. Topics change from term to term; see Schedule of Classes. Not offered every term. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 565. STUDIES IN THE NOVEL (4). Particular novelists, movements, conventions, and types of the novel throughout its history. Topics change from term to term; see Schedule of Classes. Not offered every term. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 570. STUDIES IN POETRY (4). Particular poets, movements, problems, conventions, and types of poetry in English or English translation. Topics change from term to term; see Schedule of Classes. Not offered every term. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 575. STUDIES IN CRITICISM (4). Particular critics, critical movements, issues, and histories of criticism. Topics change from term to term; see Schedule of Classes. Not offered every year. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 580. STUDIES IN LITERATURE, CULTURE AND SOCIETY (4). Study of literature in its relationship to society and culture; study of literary culture. Topics change from term to term; see Schedule of Classes. Not offered every term. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 582. STUDIES IN AMERICAN LITERATURE, CULTURE, AND THE ENVIRONMENT (4). Creative nonfiction, fiction, poetry, and film from the mid-19th century to the present, examining relationships between rural and urban, and investigating the development of important patterns in how the physical environment is perceived, represented, interpreted, and used in the United States. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 585. STUDIES IN AMERICAN LITERATURE (4). Special topics in American literary history. Organized around movements, regions, themes, or major authors. Topics change from term to term; see Schedule of Classes. Not offered every term. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 586. STUDIES IN BRITISH LITERATURE (4). Particular British writers, movements, conventions, genres, and problems. Topics change from term to term; see Schedule of Classes. Not offered every year. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

ENG 588. LITERATURE AND PEDAGOGY (4). Practices, approaches, histories, and theories of teaching literature appropriate for secondary through college settings. Considers text selection,

assignments, and evaluation. **PREREQS:** Graduate standing.

ENG 589. WRITING, LITERATURE AND MEDICINE (4). Considers medical themes in literature, social meanings of illness, and writing strategies appropriate to the healing arts. **PREREQS:** Sophomore and above.

ENG 590. HISTORY OF THE ENGLISH LANGUAGE (4). A study of the origins, changes, and reasons for changes in the grammar, sounds, and vocabulary of English from its earliest stages through its modern forms. **PREREQS:** Graduate standing.

ENG 595. LANGUAGE, TECHNOLOGY, AND CULTURE (4). Explores relationship between literacy, technology, and thought. **PREREQS:** Graduate standing.

ENG 597. INTERNATIONAL WOMEN'S VOICES (4). A study of women and literature in an international context, focusing on the cultural differences among women and the effects of gender on language and literature. **PREREQS:** Graduate standing.

ENG 598. WOMEN AND LITERATURE (4). Study of the relations between women and literature, including such issues as images of women in literature, women writers, and the effects of gender on language. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

■ FILM STUDIES COURSES

FILM 110. *INTRODUCTION TO FILM STUDIES: 1895-1945 (3). An introduction to the serious study of world cinema, 1895-1945. Class lectures will offer a variety of historical, critical and theoretical approaches. Weekly screenings of important films from the U.S., Europe, and Asia accompany the lectures. Film fee required. (H) (Bacc Core Course)

FILM 125. *INTRODUCTION TO FILM STUDIES: 1945-PRESENT (3). Provides an introduction to the serious study of world cinema, 1945-present. Class lectures will offer a variety of historical, critical and theoretical approaches. Weekly screenings of important films from the U.S., Europe, and Asia accompany the lectures. Film fee required. (H) (Bacc Core Course)

FILM 220. *TOPICS IN DIFFERENCE, POWER, AND DISCRIMINATION (4). A comparative treatment of literary topics in the context of institutional and systematic discrimination. Not offered every year. **CROSSLISTED** as ENG 220. (H) (Bacc Core Course)

FILM 245. *THE NEW AMERICAN CINEMA (4). A formalist, ideological, and commercial investigation into contemporary American cinema. Three hours of lecture and separate screenings each week. Film fee required. Not offered every year. (H) (Bacc Core Course)

FILM 245H. *THE NEW AMERICAN CINEMA (4). A formalist, ideological, and commercial investigation into contemporary American cinema. Three hours of lecture and separate screenings each week. Film fee required. Not offered every year. (H) (Bacc Core Course) **PREREQS:** Honors College approval required.

FILM 255. *WORLD CINEMA PART I: ORIGINS TO 1968 (4). A systematic introduction to the arts and history of international cinema, from the invention of the medium in 1895 to the rise of New Wave and Third Cinema in the 1960s. Weekly screenings of films such as Rashomon, Tokyo Story, Pather Panchali, Terra em Transe, and La Noire de. (Bacc Core Course)

FILM 256. *WORLD CINEMA PART II: 1968-PRESENT (4). A systematic introduction to the arts and history of international cinema, from the decolonization movement in the 1960s and the 1970s to the dynamics of globalization that we are experiencing today. Weekly screenings include

such films as A Better Tomorrow, Chungking Express, Spirited Away, Oldboy, Bombay, and City of God. (Bacc Core Course)

FILM 265. *FILMS FOR THE FUTURE (4). An interdisciplinary study of film, literary, and philosophical visions of the future. Three hours of lecture and separate screenings each week. Film fee required. Not offered every year. (H) (Bacc Core Course)

FILM 452. ^STUDIES IN FILM (4). Particular cinematographers, movements, types, conventions, or problems in film. Topics change from term to term; see Schedule of Classes. Lecture and separate screenings each week. Film fee required. Not offered every year. (H) (Writing Intensive Course) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

FILM 452H. ^STUDIES IN FILM (4). Particular cinematographers, movements, types, conventions, or problems in film. Topics change from term to term; see Schedule of Classes. Lecture and separate screenings each week. Film fee required. Not offered every year. (H) (Writing Intensive Course) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above. Honors College approval required.

FILM 480. STUDIES IN LITERATURE, CULTURE AND SOCIETY (4). Study of literature in its relationship to society and culture; study of literary culture. Topics change from term to term; see Schedule of Classes. Not offered every term. (H) This course is repeatable for a maximum of 8 credits. **PREREQS:** Sophomore standing; 8 credits of ENG 200-level or above.

FILM 552. STUDIES IN FILM (4). Particular cinematographers, movements, types, conventions, or problems in film. Topics change from term to term; see Schedule of Classes. Lecture and separate screenings each week. Film fee required. Not offered every year. This course is repeatable for a maximum of 16 credits. **PREREQS:** Graduate standing.

FILM 580. STUDIES IN LITERATURE, CULTURE AND SOCIETY (4). Study of literature in its relationship to society and culture; study of literary culture. Topics change from term to term; see Schedule of Classes. Not offered every term. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

■ WRITING COURSES

WR 115. INTRODUCTION TO EXPOSITORY WRITING (3). Introduction to rhetorical concepts and writing strategies necessary for university level written composition. Includes substantial discussion of grammar, punctuation, and usage conventions of standard written English. Does not satisfy WR 121 requirement. Graded P/N. This course is repeatable for a maximum of 6 credits.

WR 121. *ENGLISH COMPOSITION (3). Introduction to critical thinking, the writing process, and the forms of expository writing. Intensive writing practice, with an emphasis on revision. The term in which the student takes the course is determined alphabetically; see Schedule of Classes. (Bacc Core Course) **PREREQS:** Alpha Section H-N and required of all students.

WR 199. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

WR 201. *WRITING FOR MEDIA (3). Introduction to newspaper style. Introduction to reporting. (Bacc Core Course) **PREREQS:** Grade B or higher in WR 121 and 30 wpm typing speed.

WR 214. *WRITING IN BUSINESS (3). Continued practice in writing with an emphasis on the rhetorical and critical thinking demands of writers in business and industry. (Bacc Core Course) **PREREQS:** WR 121 or Placement Test

WR 222. *ENGLISH COMPOSITION (3).

Continued practice in expository writing with an emphasis on argumentation and research. (Bacc Core Course) **PREREQS:** WR 121 or Placement Test

WR 224. *INTRODUCTION TO FICTION

WRITING (3). Discussion workshop. Student work examined in context of contemporary published work. (FA) (Bacc Core Course) **PREREQS:** WR 121 or Placement Test

WR 239. INTRODUCTION TO WRITING FICTION

AND CREATIVE NONFICTION (3). Explores how to write good stories, whether real or imagined. Students will read and write in both genres, identifying the elements that make stories more vivid, more human, and more true. Students will write informal pieces and one longer work in each genre, and will workshop one story or essay. Taught via Ecampus only.

WR 240. INTRODUCTION TO NONFICTION

WRITING (3). Discussion workshop. Student work examined in context of contemporary published work. This course is repeatable for a maximum of 9 credits. **PREREQS:** WR 121

WR 241. *INTRODUCTION TO POETRY

WRITING (3). Discussion workshop. Rudiments of mechanics and some background in development of modern poetry. (FA) (Bacc Core Course) **PREREQS:** WR 121 or Placement Test

WR 303. *WRITING FOR THE WEB (3).

The production of instructive, informative, and rhetorically savvy writing for Web-based locations and applications. Helps people find information, get things done, convey their opinions, build communities, and collaborate on complex projects. (Bacc Core Course) **PREREQS:** WR 121

WR 323. *ENGLISH COMPOSITION (3).

Continued practice in writing with an emphasis on the elements of style: diction, tone, precision and economy, emphasis, figurative language. (Bacc Core Course) **PREREQS:** WR 121 or Placement Test

WR 324. *SHORT STORY WRITING (4).

Study and writing of the short story. (FA) (Bacc Core Course) This course is repeatable for a maximum of 8 credits. **PREREQS:** WR 224 and /or instructor approval required.

WR 327. *TECHNICAL WRITING (3).

Continued practice in writing with an emphasis on the rhetorical and critical thinking demands of writers in scientific and technological fields. (Bacc Core Course) **PREREQS:** WR 121 or Placement Test

WR 329. WRITING FOR LAW AND LAW

SCHOOL (3). Improves the rhetorical and structural sophistication of persuasive writing, and gives practice in writing the law application essay. Provides a thorough review of logical, grammatical, usage, and sentence-level errors. **PREREQS:** WR 121

WR 330. *UNDERSTANDING GRAMMAR

(3). Advanced study of traditional grammatical forms and conventional grammatical terms with emphasis on the assumptions underlying the structure of traditional grammar. (Bacc Core Course) **PREREQS:** WR 121 or Placement Test

WR 341. *POETRY WRITING (4).

Study and writing of verse. (FA) (Bacc Core Course) This course is repeatable for a maximum of 8 credits. **PREREQS:** WR 241 and /or instructor approval required.

WR 353. WRITING ABOUT PLACES (3).

Utilizing personal experience, reading, and research, students, study, discuss, and practice the conventions of writing about place far and near, global and local, for various audiences and in a range of formats. **PREREQS:** WR 121

WR 362. *SCIENCE WRITING (3).

Students learn and practice the conventions for writing scientific material for a variety of audiences. Involves writing and research assignments, multimedia presentations, lecture, and in-class

and online activities. (Baccalaureate Core Course)

PREREQS: WR 121

WR 383. FOOD WRITING (4).

Students will write about food and food issues for a variety of audiences, including print and digital, adapting their texts to become increasingly sophisticated critical thinkers and writers who can shape material effectively. Will also address food science and food studies from a historical and cultural background. **PREREQS:** (WR 121 and (HC 199 or PHL 121 or WR 201 or WR 214 or WR 222 or WR 224 or WR 241 or WR 323 or WR 324 or WR 327 or WR 330 or WR 341 or WR 362)) and Students need to have cleared their Baccalaureate WR II requirement in order to have the necessary writing skills to build upon for this course.

WR 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

WR 399H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PREREQS: Honors College approval required.

WR 401. RESEARCH AND SCHOLARSHIP

(1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

WR 402. INDEPENDENT STUDY (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

WR 403. THESIS (TBA) (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

WR 404. WRITING AND CONFERENCE (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

WR 405. READING AND CONFERENCE (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

WR 406. PROJECTS (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

WR 407. SEMINAR (1-16).

Topic TBA. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

WR 408. WORKSHOP (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

WR 411. ^THE TEACHING OF WRITING (4).

Pedagogy and theory in composition; prepares teachers (secondary through college) in writing process, assignment design, evaluation, and grammar. Also focuses on students' own writing. (Writing Intensive Course) **PREREQS:** Upper-division standing.

WR 414. ADVERTISING AND PUBLIC

RELATIONS WRITING (4). Writing news releases, annual reports, brochures, newsletters, and other PR materials. Writing advertising copy. **PREREQS:** WR 121 and upper-division standing.

WR 416. ADVANCED COMPOSITION (4).

The development of style and voice in both the personal and the academic essay. This course is repeatable for a maximum of 8 credits. **PREREQS:** Upper-division standing.

WR 420. STUDIES IN WRITING (4).

Selected topics in rhetoric and composition. This course is repeatable for a maximum of 8 credits. **PREREQS:** Upper-division standing.

WR 424. ADVANCED FICTION WRITING (4).

Advanced fiction workshop with an emphasis on developing longer pieces. (FA) This course is repeatable for a maximum of 8 credits. **PREREQS:** WR 324 and /or instructor approval required.

WR 441. ADVANCED POETRY WRITING (4).

Advanced poetry workshop. (FA) This course is repeatable for a maximum of 8 credits. **PREREQS:** WR 341 and /or instructor approval required.

WR 448. MAGAZINE ARTICLE WRITING (4).

Writing the magazine article. Analyzing markets and writing query and cover letters, marketing manuscripts to magazines. Interviewing and researching. **PREREQS:** Upper-division standing.

WR 449. CRITICAL REVIEWING (4).

Writing critical reviews of books, television programs, movies, plays, and restaurants for newspapers and magazines. The role of criticism in popular culture. **PREREQS:** Upper-division standing.

WR 462. SCIENCE WRITING (4).

Reporting and writing about science and technology. Interviewing scientists and interpreting scientific information. This course is repeatable for a maximum of 12 credits.

WR 466. PROFESSIONAL WRITING (4).

Introduces the texts, contexts, and concepts important to the practice of professional communication in organizational contexts, addressing practical writing skills, rhetoric, ethics, and information design. Course readings concern what professional writers do and what theories govern their actions, bridging the gap between real-world problems and academic research. **PREREQS:** WR 121 and upper-division standing for undergraduates.

WR 493. ^THE RHETORICAL TRADITION AND

THE TEACHING OF WRITING (4). Major past and contemporary theories of written communication, their historical context, and their impact on writing and the teaching of writing. (Writing Intensive Course) **PREREQS:** Upper-division standing.

WR 495. ^INTRODUCTION TO LITERACY

STUDIES (4). Literacy studies in multidisciplinary contexts. Examines historical, theoretical, and practical relationships among reading, writing, language, culture, and schooling. (Writing Intensive Course) **PREREQS:** Upper-division standing.

WR 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

WR 501. RESEARCH AND SCHOLARSHIP (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval and graduate standing required.

WR 502. INDEPENDENT STUDY (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval and graduate standing required.

WR 503. THESIS (1-16).

This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval and graduate standing required.

WR 504. WRITING AND CONFERENCE (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

WR 505. READING AND CONFERENCE (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval and graduate standing required.

WR 506. PROJECTS (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval and graduate standing required.

WR 507. SEMINAR (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval and graduate standing required.

WR 508. WORKSHOP (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval and graduate standing required.

WR 509. PRACTICUM (1-16).

Required practicum for graduate students teaching introduction to poetry writing. This course is repeatable for a maximum of 16 credits.

WR 511. THE TEACHING OF WRITING (4). Pedagogy and theory in composition; prepares teachers (secondary through college) in writing process, assignment design, evaluation, and grammar. Also focuses on student's own writing. **PREREQS:** Graduate standing.

WR 512. CURRENT COMPOSITION THEORY (4). Current rhetoric and composition theory and its applications for teachers and writers. **PREREQS:** Graduate standing.

WR 514. ADVERTISING AND PUBLIC RELATIONS WRITING (4). Writing news releases, annual reports, brochures, newsletters, and other PR materials. Writing advertising copy. **PREREQS:** Graduate standing.

WR 516. ADVANCED COMPOSITION (4). The development of style and voice in both the personal and the academic essay. This course is repeatable for a maximum of 16 credits. **PREREQS:** Graduate standing.

WR 517. TEACHING PRACTICUM: ENGLISH COMPOSITION (2). Required practicum for graduate students teaching English Composition.

WR 518. TEACHING PRACTICUM: WRITING IN BUSINESS (1). Pedagogy practicum for graduate students in the teaching of professional writing and communication. This course is required for GTA's who will teach WR 214, Writing in Business. This course is repeatable for a maximum of 3 credits.

WR 519. TEACHING PRACTICUM: TECHNICAL WRITING (1). Required practicum for graduate students teaching technical writing.

WR 520. STUDIES IN WRITING (4). Selected topics in rhetoric and composition. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

WR 521. TEACHING PRACTICUM: FICTION WRITING (1). Required practicum for graduate students teaching introduction to fiction writing. This course is repeatable for a maximum of 3 credits.

WR 522. TEACHING PRACTICUM: POETRY WRITING (1). Required practicum for graduate students teaching introduction to poetry writing. This course is repeatable for a maximum of 3 credits.

WR 524. ADVANCED FICTION WRITING (4). Advanced fiction workshop with an emphasis on developing longer pieces. This course is repeatable for a maximum of 24 credits. **PREREQS:** Instructor approval and graduate standing required.

WR 525. ADVANCED SCIENTIFIC AND TECHNICAL WRITING (4). Combines scientific and technical writing with science journalism. Students will draw on a data set (preferably their own) to draft a scientific journal article, short grant proposal, magazine article, and letter of inquiry. They will also critically evaluate and edit documents by reviewing classmates' drafts. **CROSSLISTED** as PSM 525.

WR 540. ADVANCED NONFICTION WRITING (4). Advanced creative nonfiction workshop with an emphasis on developing longer pieces. This course is repeatable for a maximum of 24 credits. **PREREQS:** Instructor approval.

WR 541. ADVANCED POETRY WRITING (4). Advanced poetry workshop. This course is repeatable for a maximum of 24 credits. **PREREQS:** Instructor approval and graduate standing required.

WR 548. MAGAZINE ARTICLE WRITING (4). Writing the magazine article. Analyzing markets and writing query and cover letters, marketing manuscripts to magazines. Interviewing and researching. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

WR 549. CRITICAL REVIEWING (4). Writing critical reviews of books, television programs, movies, plays, and restaurants for newspapers and magazines. The role of criticism in popular culture. **PREREQS:** Graduate standing.

WR 562. SCIENCE WRITING (4). Reporting and writing about science and technology. Interviewing scientists and interpreting scientific information. This course is repeatable for a maximum of 8 credits. **PREREQS:** Graduate standing.

WR 566. PROFESSIONAL WRITING (4). Introduces the texts, contexts, and concepts important to the practice of professional communication in organizational contexts, addressing practical writing skills, rhetoric, ethics, and information design. Course readings concern what professional writers do and what theories govern their actions, bridging the gap between real-world problems and academic research.

WR 593. THE RHETORICAL TRADITION AND THE TEACHING OF WRITING (4). Major past and contemporary theories of written communication, their historical context, and their impact on writing and the teaching of writing. **PREREQS:** Graduate standing.

WR 595. INTRODUCTION TO LITERACY STUDIES (4). Literacy studies in multidisciplinary contexts. Examines historical, theoretical, and practical relationships among reading, writing, language, culture, and schooling. **PREREQS:** Graduate standing.

WR 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

OTHER DEGREES & PROGRAMS WITHIN THE COLLEGE OF LIBERAL ARTS

20TH CENTURY STUDIES CERTIFICATE

As of January 2005, students are not being admitted to the 20th Century Studies Undergraduate Certificate program.

To complete the certificate program, students are required to take a minimum of 27 credits, consisting of 9 credits of core courses, 9 credits of thematic interdisciplinary courses, and 9 credits of approved elective courses.

Core Courses (9)

TCS 201. *Twentieth Century Dreams: The U.S. (3)

TCS 301. *World Community in the Twentieth Century: Underdevelopment (3)

Thematic Interdisciplinary Courses (9)

Elective Courses (9)

Elective courses may be chosen from among the many regular departmental offerings in the College of Liberal Arts. Elective credits must be outside the student's major.

RUSSIAN STUDIES CERTIFICATE

This program has been suspended.

Option I

The course of study consists of a minimum of 30 credits: 21 credits of required core courses and 9 credits of appropriate electives. In the distribution of electives, students must complete at least one course in two of the following areas: economics, history, political science.

Requirements (21)

RUS 211, RUS 212, RUS 213. Second-Year Russian (4,4,4)

RUS 231, RUS 232, RUS 233. *Russian Culture (3,3,3)

Elective Courses (9)

HST 340, HST 341. History of Russia (4,4)

HST 344. Special Topics in Russian History (4,4)

HSTS 418/HSTS 518. *Science and Society (4)

HST 345. Society in Modern Russia (4)

PS 343. *Russian Politics (4)

PS 399. Current Problems in Politics (3)

PS 402. Independent Study (1-16)

RUS 341. *20th Century Russian Literature in Translation (3)

Option II

The course of study consists of a minimum of 30 credits: 12 credits of required core courses and 18 credits of appropriate electives. In the distribution of electives, students must complete at least one course in three of the following areas: foreign languages; economics; history; political science.

Requirements (12)

RUS 111, RUS 112, RUS 113. First-Year Russian (4,4,4)

Elective Courses (18)

HST 341. History of Russia (4)

HST 344. Special Topics in Russian History (4,4)

HST 345. Society in Modern Russia (4)

HSTS 418/HSTS 518. *Science and Society (4)

PS 343. *Russian Politics (4)

PS 399. Current Problems in Politics (3)

PS 402. Independent Study (1-16)

RUS 233. *Russian Culture [20th Century] (3)

RUS 341. *20th Century Russian Literature in Translation (3)

Courses offered on a one-time basis that are directly related to Russian Studies may be used if the student receives prior approval from the Russian Studies coordinator. For example, HST 415/HST 515. Selected Topics: Stalin and Stalinism (3).

Footnote:

* Baccalaureate Core Course

The Oregon State University College of Pharmacy's Doctor of Pharmacy (PharmD) Program is accredited by the Accreditation Council for Pharmacy Education (<http://www.acpe-accredit.org/>), 135 S. LaSalle Street, Suite 4100, Chicago, IL 60603-4810, 312-664-3575, 800-533-3606; Fax, 312-664-4652. The PharmD degree is jointly conferred by Oregon State University and Oregon Health and Science University. The Oregon State University College of Pharmacy is a member of the American Association of Colleges of Pharmacy. The College of Pharmacy is dedicated to advancing societal health through leadership in pharmacy education, research, community engagement, and improved patient care.

Apetition from the pharmacists of Oregon led to the establishment of the Department of Pharmacy at Oregon State College in 1898. The department grew steadily and in 1917 became the School of Pharmacy. In 1983 it became the College of Pharmacy.

There are many career options available to individuals having a pharmacy degree. Some graduates are employed in privately owned or chain pharmacies and practice in a community setting, while others practice in hospitals or nursing homes. The pharmaceutical industry offers careers in many areas including sales, marketing, public and government relations, manufacturing, and basic research. Pharmacy graduates are also employed in various local, state and federal health agencies, including the U.S. Public Health Service and the Department of Veterans Affairs. Individuals who decide to acquire advanced professional or graduate training may follow a career in research and academics.

College of Pharmacy graduates are eligible for licensure as pharmacists throughout the United States.

Professional Program Doctor of Pharmacy (PharmD)

Graduate Major Pharmaceutical Sciences (MS, PhD)

Graduate Areas of Concentration

Biopharmaceutics
Medicinal Chemistry
Natural Products Chemistry
Pharmaceutics
Pharmacoeconomics
Pharmacokinetics
Pharmacology
Toxicology

Graduate Minor Pharmaceutical Sciences

FACULTY

Professors Block (Emeritus), Christensen, Ito, Kradjan (Emeritus), Leid, Olyaei, Zabriskie

Associate Professors

Bearden, DeLander, Filtz, Furuno, Haxby, Indra, Ishmael-Leid, Kioussi, Mahmud, McPhail, Munar, P. Proteau, R. Proteau, Singh, Stevens, Williams

Assistant Professors Alani, Cherala, Hartung, Irwin, Lee, McGregor, Morgun, Rackham, S. Ramirez, Sikora, Suchy, Taratula

Senior Instructor Zweber

Instructors Anderson, Boyce, Ketchum, Linares, Samuels, Schnabel, Starwalt

Professional Faculty Austin Haney, Beaumont, Clark, Kinsella, Mettie, Peters, J. Ramirez, Ruder

RESEARCH FACULTY

Professor, Sr. Research Associate Professor, Sr. Research Gross
Assistant Professors, Sr. Research
G. Indra, Reed, Taratula, Yin, Zielke

COURTESY FACULTY AND PRECEPTORS

The College of Pharmacy utilizes practicing pharmacists, physicians, and pharmaceutical scientists as lecturers in the professional pharmacy program and in the college's graduate education program. This group includes over 400 pharmacy preceptors. These individuals make a very important and significant contribution to the educational programs of the college.

PHARMACY INFORMATION

Professional pharmacy education has advanced both in Oregon and throughout the United States in order to meet the expectations of an evolving health care system. To be eligible for admission to the PharmD program, students must complete the PharmD prerequisites, which will require three to four years of college study. Completion of the pharmacy professional program requires an additional four years.

After completion of the four-year professional pharmacy program, the graduate is eligible to take a licensing exam administered by state boards of pharmacy. After passing the licensing exam and completing required internship training, the graduate is licensed to practice as a registered pharmacist. While time requirements may vary from state to state, most graduates become licensed as pharmacists approximately three months after graduation from Oregon State University.

PharmD PREREQUISITES

Required PharmD prerequisites may be taken at Oregon State University or any other accredited college or university. The PharmD prerequisites must be completed prior to beginning the professional program.

Required courses must be taken for a letter grade; however, an exception may be made if a course is only offered pass/no pass. The student should make a specific request for waiver of grade requirement directly to the College of Pharmacy Admissions Committee prior to taking the course.

Students from community colleges, other colleges and universities, may transfer to OSU at any time to complete the PharmD prerequisites.

EARLY ADMISSION PROGRAM

The Early Admission Program is intended to guarantee highly qualified students admitted to Oregon State University the opportunity to enter the College of Pharmacy Doctor of Pharmacy (PharmD)

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program after the successful completion of the program prerequisites and the maintenance of certain academic criteria.

GENERAL INFORMATION AND ELIGIBILITY

Acceptance to the program is competitive. The College of Pharmacy's Doctor of Pharmacy Early Admission Program applicants must meet the following **minimum criteria:**

Current high school seniors:

- High school GPA of 3.5
- At least one standardized test score (ACT of 24, SAT of 1650)

Applicants that do not meet the minimum criteria will not be considered. Students are only allowed to apply to the Early Admission Program once. Denied EAP applicants are encouraged to apply to the PharmD program through the standard process.

THE PROFESSIONAL PHARMACY PROGRAM

Enrollment in the four-year professional program is limited. Students must apply for admission to the professional pharmacy program. Application information and forms are available at <http://www.pharmCAS.org/>. Contact the OSU College of Pharmacy for other information or visit the college website at <http://pharmacy.oregonstate.edu/>. Students are admitted to the professional program beginning fall term only.

Once admitted to the professional program, each student is assigned a faculty advisor. Students may register only for those courses for which they have completed the stated prerequisite courses. Exceptions are allowed only after approval by the College of Pharmacy's Academic and Professional Standards Committee. Students will complete the first two years of their course work on the Oregon State University campus. The third professional year will be at the College of Pharmacy Satellite Campus at Oregon Health and Science University in Portland, Oregon. Most students choose to live in the Portland area during the third year. The fourth year will be off-campus at various pharmacy practice sites throughout the state of Oregon and the Northwest, including Hawaii. Contact the college directly for additional information about the PharmD curriculum.

Immunization and vaccination requirements for PharmD students are stricter than for other university students. PharmD students must satisfy all college immunization and vaccination requirements before starting classes and each year in the program. Failure to meet these requirements may delay enrollment.

The four-year professional pharmacy program provides a broad, scientifically based, clinically focused education.

Through appropriate selection of professional elective courses in the fourth year, a student may concentrate in such areas as community, institutional, geriatric, or managed care pharmacy; or prepare for graduate study.

The pharmacy profession is experiencing profound changes. These changes include an increased focus toward patient care, in addition to the study of pharmaceutical products. All students will be required to give immunizations (shots), take medical histories from patients, and perform physical examinations. These experiences will involve asking sensitive questions and physically touching other people. Throughout the curriculum, students are assigned to off-campus practice sites where they are supervised by licensed pharmacists who are affiliate faculty members of the college. Practice sites are located primarily throughout Oregon. Completion of practicum courses at these off-campus practice sites in the fourth professional year generally requires up to 40 hours per week at the practice site. Practicum experience may include nights, evenings, and weekends. Practice sites are varied but include community pharmacies, hospitals, long-term care facilities, and outpatient clinics. PharmD students are required to provide their own transportation to sites.

The College of Pharmacy requires all pharmacy students to complete criminal background checks and recommends that all pharmacy students submit to drug screening. Criminal background checks and drug screenings have become standard requirements for employment in a pharmacy and placement in experiential rotations. Criminal background checks and drug screening may also be required for licensure. Students who cannot participate in experiential rotations due to criminal or other activities of concern that are revealed in criminal background checks or drug screenings may be unable to fulfill the requirements of the professional PharmD program. Therefore, it is in everyone's interest to resolve any issues prior to commitment of resources by the college and by students.

PharmD students must immediately disclose any criminal activity that occurs prior to or while enrolled in the PharmD program. PharmD students must immediately reveal any action taken by a Board of Pharmacy, including but not limited to warning, probation and revocation of licensure. Failure to do so could result in dismissal from the PharmD program.

To become licensed by the state of Oregon to practice pharmacy, an individual must meet at least three criteria:

1. Possess a baccalaureate or PharmD degree in pharmacy from an accredited U.S. college of pharmacy,

2. Pass the North American Pharmacist Licensing Exam (NAPLEX), and
3. Complete the Oregon Board of Pharmacy internship requirements.

ADMISSION STANDARDS

Equal Opportunity and Disability Accommodation

The College of Pharmacy, as a part of Oregon State University, is committed to the principle of equal opportunity. The college does not discriminate on the basis of race, color, creed, religion, national origin, gender, sexual orientation, age, marital status, disability, and disabled veteran or Vietnam-era veteran status. When requested, the college will provide reasonable accommodation to otherwise qualified students with disabilities. Disabled students must work with and be approved by the Disability Access Services office.

Essential Characteristics of Student Pharmacists

The essential characteristics of student pharmacists identified below are drawn from a number of different resources that govern the professional expectations of pharmacists and student pharmacists, including but not limited to the national Pharmacy Code of Ethics, the Oath of a Pharmacist, and the Pledge of Professionalism. Please see Appendices to view these resources. The essential characteristics are intended to ensure that student pharmacists and pharmacists educated at the College of Pharmacy (the "college") have the capacity to meet federal and state regulations and policies that pertain to pharmacy, and to meet or exceed expectations that the public has for professional competence and behavior among pharmacy professionals.

Academic and professional environments present different challenges, but the essential characteristics required to succeed in pharmacy are common to both settings. Students in the college must observe and fulfill the essential characteristics, which have been divided into the following relevant categories: intellectual ability, empathetic and collegial communication skills, psychomotor skills, respect for diversity, high ethical standards, and behavioral and social expectations. Under each category are examples that describe and clarify these essential characteristics.

Intellectual Ability

- Comprehend, interpret and analyze new information
- Reason and carry out evidence-based decision making
- Use critical thinking skills and problem solving to evaluate information from multiple sources and synthesize a plan of action
- Thrive in a rigorous foundational and clinical science-based curriculum

- Participate in self- and programmatic-assessment intended to sustain a continual improvement process
- Be curious and pursue lifelong learning

Empathetic and Collegial Communication Skills

- Formulate concise, accurate synopses of essential information
- Contribute in a meaningful and collaborative manner in group discussions
- Interact constructively with other members of a health care team
- Communicate difficult concepts orally and in writing at an appropriate level for specific patients or audiences
- Listen empathetically and develop rapport
- Appropriately display, and interpret, nonverbal communication signals
- Communicate fluently in English
- Effectively utilize resources to communicate in non-English languages

Psychomotor Skills¹

- Participate effectively in preparation and distribution of sterile and non-sterile drug products
- Utilize and analyze information from varied sensory inputs
- Participate in drug administration, including injections
- Carry out tasks required for objective and subjective assessment of patient health
- Discern critical elements of a problem through observation

Respect for Diversity

- Communicate in a manner that respects all individuals
- Proactively seek ways to provide an inclusive environment that addresses unique patient needs
- Provide care without judgment of a patients' personal choices or situation
- Individualize care with consideration of cultural norms for the patient
- Individualize care with consideration of unique therapeutic needs or challenges

High Ethical Standards

- Maintain confidentiality
- Act with compassion, empathy and altruism
- Accept responsibility and provide leadership
- Abstain from illicit drug use
- Act with integrity and expect the same of professional colleagues

Behavioral and Social Expectations

- Demonstrate a history of appropriate behavior in personal actions
- Perform effectively and display sound judgment while under stress

- Perform appropriately in academic or professional settings
- Address disagreements with tact and avoid public altercations
- Exhibit the capacity to adapt to change readily and adjust responses in dynamic, unpredictable situations
- Accept constructive criticism and adapt behavior

Footnote:

¹ Students may be able to be admitted and progress to graduation while not possessing selected psychomotor skills. In the instance of a documented disability, the college will work to provide reasonable accommodation. The absence of some skills, however, may limit the variety of settings in which a pharmacist can work.

REQUIREMENTS FOR PROGRESSION

Doctor of Pharmacy (PharmD) students must meet university requirements and standards and adhere to the university Student Conduct Regulations (<http://oregonstate.edu/studentconduct/>). The College of Pharmacy faculty has adopted additional requirements to assure that all pharmacy graduates have the best possible educational background and preparation for their pharmacy practice careers. College of Pharmacy standards may vary from the university standards in order to ensure compliance with policies, regulations and expectations specific to the pharmacy profession.

Students are expected to meet specific academic and professional requirements to matriculate in the College of Pharmacy and to progress to each successive year of the professional program. Each student's standing in the College of Pharmacy is reviewed at the end of every term, or at any time in the interim 'for cause'. The review includes core pharmacy term GPA, cumulative GPA, and other characteristics identified as being essential to student pharmacists and pharmacists.

The professional PharmD degree program at Oregon State University is designed to be completed within four years. The program combines didactic courses, structured clinical practice opportunities, and, optimally, significant work experience to educate pharmacists that have both in-depth and up-to-date knowledge to be change agents in their chosen profession. In order to assure this current and in-depth knowledge base for each graduate, the professional program must be completed within a five-year period.

To begin the first

professional year, students:

- Must receive, and respond in a timely manner, to an offer of admission.
- Must complete all pre-pharmacy courses with a grade of C– or better.

- Must hold a current CPR and first aid certification from an approved provider.
- Must successfully complete a background check following guidelines established by the college.
- Must submit to the recommended drug screening or provide written acknowledgement of the potential consequences of declining the drug screening.
- Must attend the first-year professional orientation program, and verify an understanding and acceptance of College of Pharmacy policies and procedures.
- Must obtain an Oregon Pharmacy Intern License.
- Must fulfill the essential characteristics of student pharmacists identified by the college.

To advance into the second professional year, students:

- Must successfully complete all courses that are included in the curriculum of the first professional year, including electives with a cumulative pharmacy GPA of 2.00 and a P (Pass) in all P/N (Pass/No Pass) courses.
- Must have no more than one D grade in pharmacy courses.
- Must maintain a current Oregon Pharmacy Intern License.
- Must have a current CPR certification from an approved provider.
- Must fulfill the essential characteristics of student pharmacists identified by the college.

To advance into the third professional year, students:

- Must successfully complete all courses that are included in the curriculum of the first two professional years, including electives with a cumulative pharmacy GPA of 2.00 and a P (Pass) in all P/N (Pass/No Pass) courses.
- Must have no more than one D grade in pharmacy courses.
- Must have completed two approved elective courses with a grade of C– or better in graded courses, or with a P in Pass/No Pass (P/N) courses.
- Must successfully complete a background check during the summer preceding the third professional year
- Must maintain a current Oregon Pharmacy Intern License.
- Must have a current CPR certification from an approved provider.

- g. Must have earned a bachelor's degree.
- h. Must fulfill the essential characteristics of student pharmacists identified by the college.

To advance into the fourth professional year, students:

- a. Must successfully complete all courses that are included in the curriculum of the first three professional years, including electives with a cumulative GPA of 2.00 and a P (Pass) in all P/N (Pass/No Pass) courses.
- b. Must have no more than one D grade in pharmacy courses.
- c. Must have completed three approved elective courses, one of which must be completed after the second professional year, with a grade of C– or better in graded courses, or with a P in Pass/No Pass (P/N) courses.
- d. Must maintain a current Oregon Pharmacy Intern License. (Licensure in additional states may be required for students completing clerkships outside of Oregon.)
- e. Must have a current CPR certification from an approved provider.
- f. Must be willing to meet site specific requirements for all assigned clerkship rotations.
- g. Must verify an understanding and acceptance of College of Pharmacy policies and procedures as they pertain to advanced experiential learning.
- h. Must fulfill the essential characteristics of student pharmacists identified by the college.

To graduate with the PharmD degree, students:

- a. Must have met all requirements defined for progression through each professional year.
- b. Must successfully complete all required and elective advanced clerkships with a passing grade.
- c. Must fulfill the essential characteristics of student pharmacists identified by the college.

STUDENT STANDING IN THE COLLEGE OF PHARMACY

The Academic and Professional Standards Committee (“APSC”) may, at any time, review a student’s standing in the college. APSC is charged with ensuring that students are aware of academic performance or behavior which is not consistent with essential characteristics of student pharmacists and that, therefore, places their completion of the PharmD program at risk. Academic performance and behavioral concerns are often evaluated independently but have equal signifi-

icance in determining whether a student is meeting the essential characteristics of student pharmacists. Severe, continuing or repeated academic or behavioral problems can result in dismissal from the PharmD program.

APSC, when necessary, provides student standing information to communicate performance deficits, insufficient student progress, and lack of progress in a student addressing academic or behavioral problems. APSC and the college’s director of student services/head advisor provide students guidance regarding what the college expects from a student to increase their opportunities for success in the college. Student performance and progress are evaluated on a case-by-case basis, utilizing the experience of APSC members. APSC uses good faith, informed judgment to determine appropriate recommendations for each student’s situation.

The following student standing notifications may be received by students who are demonstrating performance deficits or insufficient progress in the PharmD program:

Warning

Warning status is cautionary and identifies student performance which may place a student’s completion of the PharmD program at risk.

Students are placed on warning status if they have a term core pharmacy GPA of less than 2.5 or receive 2 or more C grades in core or elective professional courses in a term. Students may also be placed on Warning status if they engage in behavior that does not meet the Essential Characteristics of Student Pharmacists.

- The first time students are placed on Warning status, they must meet with the Director of Student Services/Head Advisor to discuss their situation.
- The second time students are placed on Warning status, they must meet with the Director of Student Services/Head Advisor and develop a holistic action plan for overcoming academic and non-academic barriers to success. They must subsequently execute this action plan.
- The third time students are placed on Warning status, they are automatically placed on Probation.

Probation

Probation status identifies an academic or behavioral concern that places the student’s completion of the PharmD program at serious risk. Probation may be accompanied by a delay in progression at the determination of the APSC.

Students are placed on Probation status if they have a term core pharmacy GPA of less than a 2.0 or if they receive a C– or lower grade in any core or elective professional course. A third warning

automatically results in Probation.

Student behavior that is a significant departure from the Essential Characteristics of Student Pharmacists will also result in Probation status. Such behavior includes, but is not limited to, violations of Academic Integrity policies, criminal violations, repeated or intentional violation of college policies, or significant breaches of the University Student Conduct Code (see <http://oregonstate.edu/studentconduct/home/>).

Students on Probation status must follow recommendations of the APSC and the Director of Student Services/Head Advisor. Students on Probation status must meet with the Director of Student Services/Head Advisor following each term to review their progress and standing in the college. Students that successfully fulfill the recommendations prescribed will be removed from Probation status.

Students that fail to follow or are unsuccessful in fulfilling the recommendations will be suspended and evaluated for dismissal from the college. Students who are placed on Probation status for a second time will also be evaluated for dismissal from the college.

Suspension

Students that have failed to make adequate progress, or who have displayed severe or repeated departures from the Essential Characteristics of Student Pharmacists, may be placed on Suspension status. The college will place an indefinite hold on the progression of a student placed on Suspension status until APSC can adequately evaluate whether the student will be allowed to continue in the PharmD program. Students engaged in an appeal of their dismissal from the college will also be placed on Suspension status.

Students placed on Suspension status will not be allowed to progress in the PharmD program. APSC will review the status of a student on Suspension no later than the beginning of the next academic term. After review, APSC may recommend immediate Dismissal from the college, recommend that the student be continued on Suspension status pending receipt of additional information, or prescribe a plan to address specific concerns that resulted in the student’s Suspension status. If a plan for progression is developed by APSC, the student will be changed to Probation status. If at any time it becomes evident that the student will not be able to address concerns and graduate within the required five year window, the student will be dismissed immediately.

Dismissal

Students will be dismissed from the professional program if they are not making adequate academic progress, or if they fail to constructively address professional or behavioral concerns.

PROFESSIONAL ASSOCIATIONS

Students are encouraged to join various professional organizations. At OSU they may choose the following:

NCPA—National Community Pharmacists Association—Open to all students in pharmacy; affiliated with the national parent organization.

Academy of Students of Pharmacy—Open to all students in pharmacy; includes affiliation with the American Pharmaceutical Association and the Oregon State Pharmacists Association.

American Society of Health-System Pharmacists—Open to all students in pharmacy; includes membership in the Oregon Society of Health-System Pharmacists.

Rho Chi—Membership in Beta chapter of Rho Chi, national pharmaceutical honor society, is selective and based on high scholastic achievement.

Phi Delta Chi—Membership in the Beta Iota chapter of this 100-year-old national pharmacy fraternity is limited. Individuals must meet the pledge requirements.

Phi Lamda Sigma—Membership in the Beta Zeta chapter of the national fraternity is limited to qualified individuals who meet requirements for professional development and leadership.

AACP—American Association of Colleges of Pharmacy.

OSSP—Oregon State Student Pharmacists is an umbrella professional development organization for pharmacy students that includes membership in several national and state professional organizations.

SCHOLARSHIPS AND LOANS

Information about scholarships and loans is available from the College of Pharmacy website and the Office of Financial Aid and Scholarships, 541-737-2241.

WICHE PROGRAM

The College of Pharmacy accepts students supported through the Western Interstate Commission for Higher Education (WICHE) Professional Student Exchange Program. This interstate program provides the opportunity for students from the 12 cooperating states to obtain professional training not available in their home states. Residents from the states of Alaska and Nevada are eligible to apply for support in pharmacy.

To apply, the applicant must become “certified” by his or her home state. Applicants must apply to their home offices before October 15 prior to the academic year in which they plan to enroll. State certifying office contact information is available at <http://wiche.edu/psep/cert-off>.

PHARMACEUTICAL SCIENCES (MS, PhD)**Graduate Areas of Concentration**

Biopharmaceutics, medicinal chemistry, natural products chemistry, pharmaceutics, pharmacoeconomics, pharmacokinetics, pharmacology, toxicology

The emphasis of most graduate programs is on foundational research investigating drug discovery, chemistry, mechanisms of drug action, molecular biology, genomics, drug metabolism, and dosage form design.

Faculty in the department are involved in identification of new drugs from the ocean and other biological sources, biochemical toxicology, and drug metabolism studies; the design and development of new drug delivery and dosage forms; and studies on the clinical efficacy and distribution of drugs through the body as a function of dosing regimen or dosage form. They are using biochemical and molecular biological techniques to investigate signal transduction pathways mediated by phospholipids and retinoids; electrophysiological approaches to studying ion channel function; and the molecular biology of nuclear receptors and factors regulating gene expression.

PHARMACY, DOCTOR OF PHARMACY (4-YEAR) (DPhar)**First Professional Year —****Corvallis campus**

BB 490, BB 491, BB 492. Biochemistry (3,3,3)
 PHAR 707. Pharmacy Practice Symposium I: Professional Development (2)
 PHAR 708. Pharmacy Practice Symposium II: Interprofessional Communication (2)
 PHAR 709. Pharmacy Practice Symposium III: Pharmacy Law and Ethics (2)
 PHAR 710. Community Pharmacy Orientation Clerkship (6 credits, 4 weeks)
 PHAR 720, PHAR 721, PHAR 722. Pharmacy Practice I, II, III (3,3,3)
 PHAR 729. Principles of Evidence-Based Medicine I: Information Science (3)
 PHAR 733. Pharmaceutics I (3)
 PHAR 734. Pharmaceutics II (3)
 PHAR 735. Foundations of Drug Actions (4)
 PHAR 736. Foundations II: Autonomic Drug Actions (3)
 PHAR 737. Foundations of Drug Action III (3)
 PHAR 738. Health Care Systems I (2)
 PHAR 739. Health Care Systems II (2)
 Z 441, Z 442, Z 443. Advanced Human Anatomy and Physiology Laboratory (2,2,2)
 Electives (2–4)

Second Professional Year —**Corvallis campus**

PHAR 711. Institutional Orientation Clerkship (6 credits, 4 weeks)
 PHAR 726. Principles of Evidence-Based Medicine II: Drug Literature Evaluation (3)
 PHAR 740, PHAR 741, PHAR 742. Pharmacy Practice IV, V, VI (3,3,3)
 PHAR 743. Clinical Applications I: Interprofessional Communications (1)

PHAR 744. Clinical Applications II: Ethical Decision Making (1)

PHAR 745. Clinical Applications III: Transitions of Care (1)

PHAR 746. Pharmacy Management (3)

PHAR 750. Pharmacokinetics (3)

PHAR 751. Biopharmaceutics (3)

PHAR 752, PHAR 753, PHAR 754.

Pharmacology and Medicinal Chemistry I, II, III (6,7,8)

Electives (2–4)

Third Professional Year — Portland campus at OHSU

PHAR 760. Transitional Clerkship (2)
 Repeatable for 6 credits.

PHAR 761. Pathophysiology and Therapeutics I, II, III (7,7,7)

PHAR 764, PHAR 765, PHAR 766. Pharmacy Practice VII, VIII, IX (3,3,3)

PHAR 770. Advanced Pharmacokinetics (4)

PHAR 773. EBM III: Evidence Synthesis and Decision Analysis (3)

PHAR 774. Principles of Evidence-Based Medicine IV: Drug Policy (4)

Electives (2–4)

Fourth Professional Year — Off-campus Practicum

PHAR 780. Community Pharmacy Clerkship (8)

PHAR 785. Ambulatory Primary Care Clerkship (8 credits, 6 weeks)

PHAR 790. General Internal Medicine (8 credits, 6 weeks)

PHAR 792. Hospital/Health Systems Patient Care Clerkship (8)

PHAR 795. Patient Care Elective Clerkship (8 credits, 6 weeks)

PHAR 797. Elective Clerkship (8 credits, 6 weeks)

A total of seven clerkships are required. Required clerkships include PHAR 780, PHAR 785, PHAR 790, PHAR 792, and at least two selected from the list of PHAR 795 clerkships.

PHARMACEUTICAL SCIENCES GRADUATE MINOR

For more details, see the departmental advisor.

COURSES**PHAR 201. PHARMACY ORIENTATION (1).**

Career opportunities in pharmacy including community and institutional practice, government, and industry. Discussion of available educational pathways. Open to non-pharmacy students. Graded P/N.

PHAR 210. TERMINOLOGY OF THE HEALTH SCIENCES (2). Provides the student in any of the health science disciplines or pre-professional studies with a working knowledge of the terminology used in the health sciences. Open to non-pharmacy students.

PHAR 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PHAR 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PHAR 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PHAR 407. SEMINAR (1-16). One-credit section. Graded P/N. This course is repeatable for a maximum of 16 credits.

PHAR 432. ^WRITING IN THE PHARMACEUTICAL SCIENCES (2). A writing intensive course emphasizing writing used in pharmacy. **PREREQS:** Completion of WR II. **COREQS:** PHAR 321

PHAR 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PHAR 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

PHAR 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PHAR 507. SEMINAR (1-16). One-credit section. Graded P/N. This course is repeatable for a maximum of 16 credits.

PHAR 536. PRODUCT DEVELOPMENT (3). Current and novel dosage forms; product stability; therapeutic design.

PHAR 537. BIOORGANIC CHEMISTRY (3). A contemporary treatment of the chemistry, enzymology and molecular genetics techniques used in studying major natural products biosynthesis pathways in nature. Offered alternate years. **PREREQS:** CH 530 and CH 531 and CH 535. BB 590, BB 591, BB 592 are recommended.

PHAR 540. MEDICINAL NATURAL PRODUCTS CHEMISTRY (3). An overview of natural products research. Focuses on the isolation and characterization of medicinally-relevant natural products. **PREREQS:** BB 452 and CH 337. Graduate or senior standing.

PHAR 563. CANCER AND CHEMOPREVENTION (2). A summary of mechanisms of cancer progression, how cancer is detected, and introduction to chemoprevention using targeted therapy and alternative medicine. **PREREQS:** (BB 451 or BB 551) and BI 314 and (BI 460 or BI 560) or equivalent courses or second year standing in the PharmD program.

PHAR 564. RECEPTORS AND SIGNAL TRANSDUCTION: ADVANCED TOPICS (3). Advanced concepts and recent developments in receptor pharmacology. Topics include receptor theory and regulation and signal transduction pathways and functions. Offered alternate years. **CROSSLISTED** as MCB 564. **PREREQS:** Instructor's approval required. Suggested prerequisite MCB 556 or PHAR 591.

PHAR 565. MAMMALIAN MOLECULAR GENETICS (3). Covers general principles of the molecular genetics and functional genomics of mammalian organ system development. Advanced methodologies and emerging biotechnologies and their social, economic, political and cultural impacts will be discussed. **CROSSLISTED** as MCB 565. **PREREQS:** BB 450 and BB 490 and MCB 556

PHAR 571. EXPERIMENTAL APPROACH TO BIOPHARMACEUTICS (3). Experimental protocol, rationale, and procedures in clinical pharmacokinetic, pharmacokinetic, and biopharmaceutical experiments. **PREREQS:** PHAR 750

PHAR 572. APPLIED BIOPHARMACEUTICS AND PHARMACOKINETICS (3). Pharmacokinetics and bioavailability of drugs in clinical care, including changing disease states. **PREREQS:** Graduate standing.

PHAR 573. CURRENT TOPICS IN PHARMACEUTICAL SCIENCES (1-3). Critical evaluation of contemporary pharmaceuticals and pharmacokinetics research articles. This course is repeatable for a maximum of 9 credits.

PHAR 575. ADVANCED XENOBIOTIC METABOLISM (3). Familiarizes students with basic principles of drug/xenobiotic metabolism. Concepts addressed include how foreign chemicals or xenobiotics are absorbed, distributed and metabolized; induction and inhibition of metabolism; effect of age, species, hormones, and disease on metabolism; genetic polymorphisms: effect of diet and environment; experimental techniques in xenobiotic metabolism; and regulatory issues (FDA and EPA). **PREREQS:** Graduate or professional pharmacy student standing.

PHAR 580. PHARMACODYNAMIC AND PHARMACOKINETIC MODELING (3). Evaluation of strengths and weaknesses of mathematical models relative to pharmacodynamic and pharmacokinetic data. **PREREQS:** PHAR 750

PHAR 591. PHARMACOLOGY I (5). Principles of pharmacology; molecular, cellular, and physiologic mechanisms of drug action; pharmacological rationale for therapeutic and toxicologic treatment outcomes. **PREREQS:** Graduate standing and instructor permission.

PHAR 592. PHARMACOLOGY II (5). Principles of pharmacology; molecular, cellular, and physiologic mechanisms of drug action; pharmacologic rationale for therapeutic and toxicologic treatment outcomes. **PREREQS:** Graduate standing and instructor permission.

PHAR 593. PHARMACOLOGY III (5). Principles of pharmacology; molecular, cellular, and physiologic mechanisms of drug action; pharmacologic rationale for therapeutic and toxicologic treatment outcomes. **PREREQS:** Graduate standing and instructor permission.

PHAR 601. RESEARCH (1-16). This course is repeatable for a maximum of 99 credits. **PREREQS:** Departmental approval required.

PHAR 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

PHAR 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PHAR 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PHAR 662. HORMONE ACTION (3). Mechanisms of action of peptide and steroid hormones and related compounds at the cellular level. **CROSSLISTED** as ANS 662, BB 662, MCB 662. **PREREQS:** BB 451 or BB 551 or BB 492 or BB 592

PHAR 701. RESEARCH AND SCHOLARSHIP (1-8). Research conducted by professional pharmacy students under faculty supervision. This course is repeatable for a maximum of 12 credits.

PHAR 703. THESIS (1-8). Independent study and analysis that culminates in a thesis. This course is repeatable for a maximum of 999 credits.

PHAR 705. READING AND CONFERENCE (1-8). This course is repeatable for a maximum of 12 credits.

PHAR 707. PROFESSIONAL PRACTICE SYMPOSIUM I: PROFESSIONAL DEVELOPMENT (2). Orientation for future pharmacists with an emphasis on professionalism and legal aspects of pharmacy, in addition to ethical decision-making. Preparation for the experiential component of the program will also take place within the course. Graded P/N. **PREREQS:** First-year standing in the PharmD program.

PHAR 708. PROFESSIONAL PRACTICE SYMPOSIUM II: INTERPROFESSIONAL COMM (2). Orientation for future pharmacists with an emphasis on professionalism and legal aspects of pharmacy, in addition to ethical decision-making.

Preparation for the experiential component of the program will also take place within the course. Graded P/N. **PREREQS:** PHAR 707. **COREQS:** PHAR 721.

PHAR 709. PHARMACY PRACTICE SYMPOSIUM III: PHARMACY LAW AND ETHICS (2). Provides an orientation to the future pharmacist with an emphasis on professionalism and legal aspects of pharmacy, in addition to ethical decision-making. Preparation for the experiential component of the program will also take place within the course. Graded P/N. **PREREQS:** PHAR 708. **COREQS:** PHAR 722.

PHAR 710. COMMUNITY PHARMACY ORIENTATION CLERKSHIP (6). Supervised education in community pharmacy practice environments, emphasizing the application of basic pharmaceutical care skills. Graded P/N. This course is repeatable for a maximum of 99 credits. **PREREQS:** Second year PharmD standing, Oregon pharmacy intern license, current first aid and CPR certification, College of Pharmacy immunization documentation.

PHAR 711. INSTITUTIONAL ORIENTATION CLERKSHIP (6). Supervised professional education in institutional pharmacy practice environments, emphasizing the application of basic pharmaceutical care skills. Graded P/N. **PREREQS:** Second year PharmD standing, Oregon pharmacy intern license, current first aid and CPR certification, College of Pharmacy immunization documentation.

PHAR 713. SPANISH FOR PHARMACY PROFESSIONALS (2). For the pharmacy professional with little or no Spanish language background (those with some Spanish language skills would find it beneficial). The course is presented in a video format with in-class facilitator for discussion. Provides basic Spanish grammar instruction but the focus will be on vocabulary and communication in a community pharmacy environment. **PREREQS:** **COREQS:** PHAR 723.

PHAR 714. EVIDENCE-BASED EVALUATION OF NUTRITION SUPPLEMENTS (2). Investigation of the biochemical basis and examination of the evidence behind therapeutic claims of nutritional supplements. **PREREQS:** BB 491 and PHAR 722 and PHAR 729 and PHAR 736. **COREQS:** BB 492 and PHAR 723 and PHAR 737

PHAR 715. PRESCRIPTION DRUG ABUSE (2). Examines the issue of prescription drug abuse among the general population. Graded P/N. **PREREQS:** Current standing in PharmD program.

PHAR 716. HEALTHCARE CHALLENGES FOR PERSONS WITH DISABILITIES (1). Students develop an understanding of healthcare challenges faced by persons with physical and mental disabilities. Graded P/N. This course is repeatable for a maximum of 2 credits.

PHAR 717. SENIOR CARE PHARMACY (2). Provides an overview of senior care pharmacy practice including an introduction to the senior patient, the senior care healthcare environment, medication-related problems in the elderly, the role of the pharmacist as a member of the interdisciplinary senior healthcare team, and employment opportunities in senior care pharmacy. Graded P/N. **PREREQS:** First-year professional standing in the College of Pharmacy and PHAR 723 and PHAR 735 and PHAR 739

PHAR 718. NATURAL PRODUCT DRUG DEVELOPMENT (2). Overview of the process of drug development, with an emphasis on natural product sources of lead components. Top-selling and mainstay drugs will be researched in literature assignments and discussed to illustrate historical and current drug development paradigms. In addition, future approaches to drug discovery and paradigm shifts to incorporate concepts such as network pharmacology will be explored. **PREREQS:** Second-year standing in the PharmD program.

PHAR 719. POISONS AND TOXINS (2). Covers many different types of substances, including common household poisons, poisonous plants and mushrooms, toxic gases/metals, shellfish toxins, and other natural toxins. Aspects of the chemistry and pharmacology of the poisons, antidotes/treatments, and occasional case studies will be covered. Historical examples and current events will also be incorporated into the course materials. **PREREQS:** PHAR 735

PHAR 720. PHARMACY PRACTICE I (3). Basic dispensing procedures, patient communications, nonprescription drugs, clinical data collection, care plans, drug information and education. Dispensing practices; patient counseling principles; nonprescription drugs. **PREREQS:** PHAR 723 should be taken concurrently.

PHAR 721. PHARMACY PRACTICE II (3). Interviewing skills; patient drug, education; nonprescription drugs. **PREREQS:** PHAR 720. **COREQS:** PHAR 724 and PHAR 730.

PHAR 722. PHARMACY PRACTICE III (3). Pharmacy Practice III continues the progression of topics introduced in Pharmacy Practice I and II. Patient interview and assessment techniques, communication skills, nonprescription products, and compounding techniques are emphasized in the lab. Lec/lab. **PREREQS:** PHAR 720 and PHAR 721 and PHAR 735 and BB 490 and BB 491. **COREQS:** PHAR 725 and BB 492

PHAR 726. PRINCIPLES OF EVIDENCE-BASED MEDICINE II: DRUG LIT EVAL (3). Students will learn to critique and evaluate health-related scientific journal articles using valid established techniques. **PREREQS:** Second-year standing in the PharmD program.

PHAR 728. PHARMACY LAW (3). Federal and state laws regulating pharmacy practice. **PREREQS:** PHAR 727

PHAR 729. PRINCIPLES OF EVIDENCE-BASED MEDICINE I: INFORMATION SCIENCE (3). Students will learn to identify appropriate information resources and will systematically collect, arrange, and analyze pertinent information related to a particular patient or drug product problem. **PREREQS:** First-year standing in the PharmD program.

PHAR 733. PHARMACEUTICS I (3). Students develop an in-depth understanding of drug dosage formulation concepts to optimize drug therapy. **PREREQS:** BB 490 and PHAR 735 and first-year standing in PharmD program.

PHAR 734. PHARMACEUTICS II (3). Preformulation and formulation factors affecting the development, production and use of pharmaceutical dosage forms, including ingredients in, and physical, chemical, and biological properties affecting storage, stability, and handling of dosage forms. Lec/lab. **PREREQS:** PHAR 733 and PHAR 735 and BB 491 and first-year standing in the professional PharmD program.

PHAR 735. FOUNDATIONS OF DRUG ACTIONS (4). Introductory course into actions of chemicals on physiological systems. Concepts encompass drug absorption and distribution, drug design and characterization of drug interactions with specialized cellular components, drug activation of biological response via biochemical or molecular transduction mechanisms, drug-induced toxicities and drug biotransformation or excretion. Approved for use on a graduate program of study. **PREREQS:** BB 490 and PHAR 729 and Z 430. **COREQS:** Z 442 and BB 491 or Z 431.

PHAR 736. FOUNDATIONS II: AUTONOMIC DRUG ACTIONS (3). Drug actions in the autonomic nervous system (ANS) provide a template for understanding drug actions throughout biological systems. Provides a complete consideration of pharmacologic and medicinal chemistry principles as they relate to drug interactions with the ANS. Treatment options for selected diseases that respond to drugs acting

on the ANS are also addressed. **PREREQS:** PHAR 729 and PHAR 735. **COREQS:** BB 491.

PHAR 737. FOUNDATIONS OF DRUG ACTION III (3). Vitamins and their role in biochemical processes, the specifics of immunologic responses, and the application of genetics to drug discovery are areas of expertise increasingly required for characterization of disease processes and recognition of novel treatment strategies. Foundations III builds upon the general background of students in these three areas to provide a common baseline of knowledge and allow for integration of concepts required to understand drug discovery and drug action. **PREREQS:** PHAR 729 and PHAR 736. **COREQS:** PHAR BB 492

PHAR 738. HEALTHCARE SYSTEMS I (2). Examination of the U.S. healthcare industry and the public healthcare system, as they relate to pharmacy. Emphasis is given to changing relationships between healthcare systems, patients, providers of care, hospitals, insurers, employers and the government. **PREREQS:** Must also take PHAR 728 concurrently.

PHAR 739. HEALTHCARE SYSTEMS II (2). Examination of the U.S. healthcare industry and the public healthcare system, as they relate to pharmacy. Emphasis is given to changing relationships between healthcare systems, patients, providers of care, hospitals, insurers, employers and the government. **PREREQS:** PHAR 728 and PHAR 738

PHAR 740. PHARMACY PRACTICE IV (3). Basic physical assessment skills and identification of therapeutic endpoints and monitoring parameters for drugs presented in the medicinal chemistry/pharmacology sequence. Students will gain experience in basic physical assessment skills, interviewing skills, history taking, organizing pharmacy notes, and documenting information. Lec/lab. **PREREQS:** PHAR 722 and PHAR 725 and PHAR 729 and PHAR 734 and PHAR 735. **COREQS:** PHAR 743 and PHAR 752

PHAR 741. PHARMACY PRACTICE V (3). Basic physical assessment skills and identification of therapeutic endpoints and monitoring parameters for drugs presented in the medicinal chemistry/pharmacology sequence. Students will gain experience in basic physical assessment skills, interviewing skills, history taking, organizing pharmacy notes, and documenting information. Lec/lab. **PREREQS:** PHAR 740. **COREQS:** PHAR 744 and PHAR 753

PHAR 742. PHARMACY PRACTICE VI (3). Basic physical assessment skills and identification of therapeutic endpoints and monitoring parameters for drugs presented in the medicinal chemistry/pharmacology sequence. Students will gain experience in basic physical assessment skills, interviewing skills, history taking, organizing pharmacy notes, and documenting information. Lec/lab. **PREREQS:** PHAR 741. **COREQS:** PHAR 745 and PHAR 754

PHAR 743. CLINICAL APPLICATIONS I: INTERPROFESSIONAL COMMUNICATIONS (1). Students are assigned to institutional or ambulatory care pharmacy settings, and experiences emphasize topics and communication methods covered in the corresponding pharmacy practice course. Graded P/N. **PREREQS:** Oregon pharmacy intern license required. **COREQS:** PHAR 740

PHAR 744. CLINICAL APPLICATIONS II: ETHICAL DECISION MAKING (1). Students are assigned to institutional or ambulatory care pharmacy settings, and experiences emphasize topics and communication methods covered in the corresponding pharmacy practice course. Graded P/N. **PREREQS:** Oregon pharmacy intern license required. **COREQS:** PHAR 741

PHAR 745. CLINICAL APPLICATIONS III: TRANSITIONS OF CARE (1). Students are assigned to institutional or ambulatory care

pharmacy settings, and experiences emphasize topics and communication methods covered in the corresponding pharmacy practice course. Graded P/N. **PREREQS:** Oregon pharmacy intern license required. **COREQS:** PHAR 742

PHAR 746. PHARMACY MANAGEMENT (3). Concepts, principles and fundamentals of pharmacy financial and personnel management. Approved for use on a graduate program of study.

PHAR 750. PHARMACOKINETICS (3). Pharmacokinetics and bioavailability of drugs in clinical care, including changing disease states. Approved for use on a graduate program of study. **PREREQS:** PHAR 734. **COREQS:** PHAR 752

PHAR 751. BIOPHARMACEUTICS (3). Preformulation and formulation factors affecting physiological outcomes in terms of bioavailability and drug product selection. Approved for use on a graduate program of study. **PREREQS:** PHAR 734. **COREQS:** PHAR 753

PHAR 752. PHARMACOLOGY AND MEDICINAL CHEMISTRY I (6). Molecular, cellular and physiologic basis of drug action. Influence of chemical and physical properties in structure-activity relationships. Drug design as it relates to drug metabolism and drug action. Pharmacologic rationale for therapeutic and toxicologic treatment outcomes. Approved for use on a graduate program of study. **PREREQS:** Second-year standing in the PharmD program. Z 441 and Z 442 and Z 443 and PHAR 734 and PHAR 735

PHAR 753. PHARMACOLOGY AND MEDICINAL CHEMISTRY II (7). Molecular, cellular and physiologic basis of drug action. Influence of chemical and physical properties in structure-activity relationships. Drug design as it relates to drug metabolism and drug action. Pharmacologic rationale for therapeutic and toxicologic treatment outcomes. Approved for use on a graduate program of study. **PREREQS:** PHAR 752 and second-year standing in the PharmD program. **COREQS:** PHAR 741, PHAR 751

PHAR 754. PHARMACOLOGY AND MEDICINAL CHEMISTRY III (8). Molecular, cellular and physiologic basis of drug action. Influence of chemical and physical properties in structure-activity relationships. Drug design as it relates to drug metabolism and drug action. Pharmacologic rationale for therapeutic and toxicologic treatment outcomes. Approved for use on a graduate program of study. **PREREQS:** Second-year standing in the PharmD program. PHAR 751 and PHAR 753. **COREQS:** PHAR 742

PHAR 759. INTRODUCTION TO PATHOPHYSIOLOGY AND THERAPEUTICS (3). Introduction to the pathophysiological basis of disease and drug therapy management. **PREREQS:** Second year standing in the PharmD program. **COREQS:** PHAR 754.

PHAR 760. TRANSITIONAL CLERKSHIP (2). Supervised introductory professional education in a variety of health care settings. Emphasis will be on gaining familiarity with the provision of clinical pharmacy services and the patients, health care providers, and administrative procedures of the clinical site. Graded P/N. This course is repeatable for a maximum of 6 credits. **PREREQS:** Oregon pharmacy intern license required. **COREQS:** PHAR 764 and PHAR 765 and PHAR 766

PHAR 761. PATHOPHYSIOLOGY AND THERAPEUTICS I (8). Pathophysiological basis of disease and drug therapy management. **PREREQS:** Third-year standing in the PharmD program. **COREQS:** PHAR 764 and PHAR 770

PHAR 762. PATHOPHYSIOLOGY AND THERAPEUTICS II (7). Pathophysiological basis of disease and drug therapy management. **PREREQS:** PHAR 761. **COREQS:** PHAR 765 and PHAR 771

PHAR 763. PATHOPHYSIOLOGY AND THERAPEUTICS III (7). Pathophysiological basis of disease and drug therapy management.

PREREQS: PHAR 762. **COREQS:** PHAR 766 and PHAR 774

PHAR 764. PHARMACY PRACTICE VII (3). Development of skills for advanced drug therapy problem identification, assessment, and plan resolution for patients with diseases discussed in PHAR 761, PHAR 762, PHAR 763. Students will integrate interviewing, physical assessment, and problem-solving to identify, assess, and resolve drug therapy problems, and communicate findings in SOAP notes, care plans, and case presentations. **PREREQS:** PHAR 740 and PHAR 741 and PHAR 742 and third-year standing in the PharmD program. **COREQS:** PHAR 760 and PHAR 761 and PHAR 770

PHAR 765. PHARMACY PRACTICE VIII (3). Development of skills for advanced drug therapy problem identification, assessment, and plan resolution for patients with diseases discussed in PHAR 761, PHAR 762, PHAR 763. Students will integrate interviewing, physical assessment, and problem-solving to identify, assess, and resolve drug therapy problems, and communicate findings in SOAP notes, care plans, and case presentations. **PREREQS:** PHAR 761 and PHAR 764. **COREQS:** PHAR 760 and PHAR 762 and PHAR 771

PHAR 766. PHARMACY PRACTICE IX (3). Development of skills for advanced drug therapy problem identification, assessment, and plan resolution for patients with diseases discussed in PHAR 761, PHAR 762, PHAR 763. Students will integrate interviewing, physical assessment, and problem-solving to identify, assess, and resolve drug therapy problems, and communicate findings in SOAP notes, care plans, and case presentations. Lec/lab/rec. **PREREQS:** PHAR 762 and PHAR 765. **COREQS:** PHAR 760 and PHAR 772

PHAR 770. ADVANCED PHARMACOKINETICS (4). A physiologic approach to understanding advanced pharmacokinetic principles. Approved for use on a graduate program of study. **PREREQS:** PHAR 750 and PHAR 751 and third-year standing in the PharmD program

PHAR 773. EBM III: EVIDENCE SYNTHESIS AND DECISION ANALYSIS (3). Covers the principles required for evidence-based medicine, including interpreting and applying results from clinical, humanistic, and economic research to medical decision-making. Approved for use on a graduate program of study. **PREREQS:** PHAR 726 and PHAR 729 and third-year standing in the PharmD curriculum.

PHAR 774. PRINCIPLES OF EVIDENCE-BASED MEDICINE IV: DRUG POLICY (4). Covers a variety of issues related to drug policy and drug use management. Population-based strategies to improve drug use will be emphasized along with developing an evidence-based process for evaluating drug therapy. Two major course projects will focus on application of principles taught in this and previous courses. Approved for use on a graduate program of study. **PREREQS:** PHAR 773

PHAR 775. PROFESSIONAL TRANSITIONS (1). Professional pharmacy students are directed in preparations for transition to postgraduate educational opportunities or entry-level pharmacist positions. Graded P/N. **PREREQS:** Fourth-year standing in the PharmD program.

PHAR 776. PHARMA-CSI (2). Application of PK, PD, and P'genomic concepts, principles, and equations in computer workshops to solve drug therapy misadventures. Approved for use on a graduate program of study. **PREREQS:** PHAR 770; third-year standing in the PharmD program or permission of instructor.

PHAR 777. ACUTE MEDICAL EMERGENCIES (2). Drug therapy management in the critically ill patient. Graded P/N. **PREREQS:** PHAR 762

PHAR 778. ADVANCED ADULT MEDICINE (2). Adult medicine elective utilizes actual patient cases to enhance knowledge of pharmacy and the pharmacologic basis of therapeutics in the setting of adult medicine, emphasizing application or current guidelines and major clinical trials for commonly encountered disease states. Graded P/N. **PREREQS:** Third-year standing in PharmD program and PHAR 761 and PHAR 762 and PHAR 764 and PHAR 765.

PHAR 780. COMMUNITY PHARMACY CLERKSHIP (8). Supervised advanced professional education in ambulatory care pharmacy practice environment. Emphasis is placed on the application of direct and indirect pharmaceutical patient care and direct interactions with other health care professionals. Students will evaluate, assess and monitor pharmacotherapy of acute and chronic diseases in addition to providing drug information. Graded P/N. This course is repeatable for a maximum of 32 credits. **PREREQS:** PHAR 760 and PHAR 763 and PHAR 766 and PHAR 772 and PHAR 774 and Oregon pharmacy intern license and current CPR certification and College of Pharmacy immunization documentation.

PHAR 785. AMBULATORY PRIMARY CARE CLERKSHIP (8). Supervised advanced professional education in ambulatory care pharmacy practice environment. Emphasis is placed on the application of direct and indirect pharmaceutical patient care and direct interactions with other health care professionals. Students will evaluate, assess and monitor pharmacotherapy of acute and chronic diseases in addition to providing drug information to patients and health care professionals. Graded P/N. This course is repeatable for a maximum of 32 credits. **PREREQS:** PHAR 760 and PHAR 763 and PHAR 766 and PHAR 772 and PHAR 774 and Oregon pharmacy intern license and current CPR certification and College of Pharmacy immunization documentation.

PHAR 790. GENERAL INTERNAL MEDICINE CLERKSHIP (8). Supervised advanced professional education located in internal medicine inpatient pharmacy practice environment. Emphasis is placed on the application of biomedical and pharmaceutical sciences to direct and indirect pharmaceutical patient care and direct interactions with other health care professionals. Students will evaluate, assess, and monitor pharmacotherapy involved in a wide variety of acute and chronic diseases. In addition, students will provide drug information to other health care professionals and patients. Graded P/N. This course is repeatable for a maximum of 32 credits. **PREREQS:** PHAR 760 and PHAR 763 and PHAR 766 and PHAR 772 and PHAR 774 and Oregon pharmacy intern license and current CPR certification and College of Pharmacy immunization documentation.

PHAR 792. HOSPITAL/HEALTH SYSTEMS PATIENT CARE CLERKSHIP (8). Supervised advanced professional education located in various hospital or health care systems patient care-oriented settings. Emphasis is placed on application of pharmaceutical sciences and pharmacotherapy to patient care. Graded P/N. This course is repeatable for a maximum of 24 credits. **PREREQS:** (PHAR 760* and PHAR 763* and PHAR 766* and PHAR 774*) and Oregon Pharmacy Intern License and current CPR certification and fourth year standing in the pharmacy professional program and College of Pharmacy immunization documentation.

PHAR 795. PATIENT CARE ELECTIVE CLERKSHIP (8). Supervised advanced professional education located in various patient care-oriented settings. Emphasis is placed on the application of pharmaceutical sciences and pharmacotherapy to direct and indirect pharmaceutical care. Specialties include but are not limited to geriatrics, pediatrics, infectious disease, oncology, general patient care, nutrition support, nuclear pharmacy, home infusion, critical care, anticoagulation, pain management, etc. Graded P/N. This course is repeatable for a maximum of 24 credits. **PREREQS:** PHAR 760 and PHAR 763 and PHAR 766 and PHAR 772 and PHAR 774 and Oregon pharmacy intern license and current CPR certification and College of Pharmacy immunization documentation.

PHAR 797. ELECTIVE CLERKSHIP (8). Supervised advanced professional education located in various pharmacy-oriented settings. Emphasis is placed on the application of pharmaceutical sciences and pharmacotherapy to a variety of environments involving pharmacy. Specialties include but are not limited to managed care, drug information, administration, pharmaceutical research, pharmaceutical industry, professional pharmacy organizations, etc. Graded P/N. This course is repeatable for a maximum of 24 credits. **PREREQS:** PHAR 760 and PHAR 763 and PHAR 766 and PHAR 772 and PHAR 774 and Oregon pharmacy intern license and current CPR certification and College of Pharmacy immunization documentation.

PHAR 798. PHARMACY HEALTH ADMINISTRATION (8). Provides students the opportunity to integrate and apply leadership and business principles necessary to operate and manage a pharmacy business or department in a diverse organizational environment. This course is repeatable for a maximum of 16 credits. **PREREQS:** PHAR 760 and PHAR 763 and PHAR 766 and PHAR 772 and PHAR 774 and Oregon Pharmacy Intern License, current CPR certification, College of Pharmacy immunization documentation, reading and understanding the Advanced Experiential Manual.

PHAR 799. SELECTED TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

Lifelong health and well-being for every person, every family, every community.

Inspired by our mission as a leading land grant university, we create synergy in teaching, research, and outreach to develop the next generation of globally minded public health and human sciences professionals. Through interdisciplinary research and innovative curricula, we advance knowledge, policies, and practices that improve population health in communities across Oregon and beyond.

The College of Public Health and Human Sciences offers a comprehensive array of undergraduate and graduate education programs under the public health umbrella.

Our graduates are employed in a wide variety of research, education, service, management, and leadership positions in business, government, industry, education, and agencies related to health, nutrition, education, community development, and family relationships.

The college's scholarly and creative work improves the lives of individuals, families, and communities. Reflecting the strength and diversity of our faculty and disciplines, this work includes laboratory-based investigations of nutrition and physiology.

Our outreach and engagement initiatives and programs serve individuals, families, professionals, and communities across the campus, Oregon, the nation, and the world. This outreach includes OSU Extension's Family and Community Health program, active continuing education initiatives ranging from credit and noncredit courses to full degrees, and service programs that serve OSU students, faculty, staff, as well as individuals and families.

DEGREE PROGRAMS

Advanced degrees include the master of arts (MA), master of public health (MPH), the master of science (MS), and doctor of philosophy (PhD). The MS and PhD degrees are offered in units of the college. Most units also participate in the master of arts interdisciplinary studies (MAIS) graduate degree program.

ADVISING

The Office of Academic Advising is a primary source of information for all College of Public Health and Human Sciences undergraduate students. Students receive accurate, thorough, and timely information regarding their degree requirements, academic progress, job opportunities, and campus activities. Professional advisors oversee the undergraduate students within the college. Faculty members also serve a vital role to undergraduates by providing professional and career advice. Faculty members often involve students in research and professional activities that create opportunities for leadership, personal growth, and discovery.

INTERNSHIPS AND PRACTICUMS

To help prepare students in the College of Public Health and Human Sciences for careers, many of the degree programs include internships and/or practicum experiences as part of their academic programs. These opportunities provide students with invaluable work experience in their field of study and may lead to postgraduate employment. Faculty members help place students and assist in the structure of these experiences. Additional information is available at <http://health.oregonstate.edu/students/current/undergraduate/internships>.

DOUBLE DEGREES IN EDUCATION OR INTERNATIONAL STUDIES OR SUSTAINABILITY

Undergraduates with majors in the College of Public Health and Human Sciences can earn a second degree in education or international studies or sustainability. See the College of Education or International Programs or Department of Forest Ecosystems and Society sections of this catalog for more information.

SCHOLARSHIPS

The College of Public Health and Human Sciences offers a variety of scholarships to deserving students. Many are reserved for students in designated majors or for first-year students. A list of scholarships and application forms are available from the college's website at <http://health.oregonstate.edu/students/current/undergraduate/scholarships>.

Additional scholarship information is also available at the OSU Office of Financial Aid and Scholarships.

COLLEGE REQUIREMENTS

The College of Public Health and Human Sciences requires H 100, Introduction to Public Health (4), for all undergraduate majors in the college, effective Fall 2012.

SCHOOL OF BIOLOGICAL AND POPULATION HEALTH SCIENCES

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Email: anthony.wilcox@oregonstate.edu
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For Student Advising Inquiries:
Student Services, 541-737-8900

FACULTY

Professors Brandt, Bray, Cardinal, Harding, Ho, Jump, Manore, Traber, Turner

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Email: debbie.jensen@oregonstate.edu
Website: <http://health.oregonstate.edu/students/>

Or:

<http://health.oregonstate.edu/students/current/undergraduate/advising>

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Assistant Professors Bethel, Hannigan-Downs, Hystad, John, Johnson, Kile, Kincl, MacDonald, Norcross, Odden, Wegis, S. Wong
Senior Instructors Dark, Hoisington, Maddalozzo

Instructors Carr, Chavez, Dodge-Vera, Fitch, Halverson, Hatfield, L. Hoffman, Hyde, Kasianchuk, Kirk, Lyford, Maille, Marchant, Ostby, Penry, Pilolla, Polizzi, Rudolph, Russell, Schruppf, Silberstein, Skoog, Steele, Streit, Su, Swanger, Todd
Associate Professor (Senior Research) Harper
Research Associates M. Bovbjerg, Machha, C. Wong
Senior Faculty Research Assistant Hardin
Faculty Research Assistant Olson
Professional Faculty Gayler, Ibarra

Undergraduate Majors

Athletic Training (BS, CRED, HBS)
Exercise and Sport Science (BS, CRED, HBS)

Options

Applied Exercise and Sport Science
Fitness and Nutrition
Physical Education Teacher Education
Pre-therapy and Allied Health

Nutrition (BS, CRED, HBS)

Options

Pre-Dietetics
Dietetics
Nutrition and Health Sciences
Nutrition and Foodservice Systems

Undergraduate Minors

Environmental Safety and Health
Exercise Physiology
Nutrition

(Please check with the Office of Academic Advising and Student Support in 116 Milam Hall for minor requirements.)

Graduate Majors

Exercise and Sport Science
(MAIS, MS, PhD)

Graduate Areas of Concentration

Exercise Physiology
Movement Studies in Disability
Neuromechanics
Physical Activity and Public Health
Sport and Exercise Psychology
Sport Pedagogy

Nutrition (MAIS, MS, PhD)

Graduate Area of Concentration

Nutrition

Public Health (MPH, PhD)

Graduate Areas of Concentration

Biostatistics (MPH only)

Environmental and Occupational Health and Safety (MPH, PhD)
Epidemiology (MPH only)
Health Management and Policy (MPH only)
Health Policy (PhD only)
Health Promotion and Health Behavior (MPH, PhD)
International Health (MPH only)

Graduate Minors

Exercise and Sports Science
Nutrition
Public Health

Graduate Certificate

Graduate Certificate in Public Health

The School of Biological and Population Health Sciences comprises the fields of exercise and sport science, nutrition, and the public health disciplines of biostatistics, epidemiology, international health, and environmental and occupational health and safety. These disciplinary approaches link individual biology and behavior to population and environmental health to better understand how environmental and behavioral factors, including food and nutrition, physical activity, water, pollution, carcinogens, biohazards, etc., influence the development and progression of biological disease. Applying the quantitative methods of epidemiology and biostatistics allows better understanding of the causes of population-level disease as well as methods of intervention and prevention.

The School of Biological and Population Health Sciences houses the undergraduate degrees of Exercise and Sport Science, Nutrition, and Athletic Training. Nationally recognized programs prepare students for careers as athletic trainers, dietitians, medical and allied health science professionals, teachers in physical education, nutritionists, researchers, personal trainers, and fitness and nutrition professionals. The majors and their options are described below.

The Bachelor of Science degree in Public Health is offered through the School of Social and Behavioral Health Sciences, which can be found at <http://health.oregonstate.edu/sbhs>.

The school houses the Masters in Public Health (MPH) tracks of biostatistics, epidemiology, international health, and environmental and occupational health and safety. For more information about the MPH program and its areas of concentration, see <http://health.oregonstate.edu/degrees/graduate/public-health/mph>. Environment, safety and health is also an area of concentration within the Public Health doctoral program (see <http://health.oregonstate.edu/degrees/graduate/public-health/phd-program>).

Master's and doctoral degrees are available in Nutrition (see [\[health.oregonstate.edu/degrees/graduate/nutrition\]\(http://health.oregonstate.edu/degrees/graduate/nutrition\)\) and Exercise and Sport Science \(see <http://health.oregonstate.edu/degrees/graduate/exercise-sport-science>\).](http://health.</p>
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UNDERGRADUATE MAJORS

ATHLETIC TRAINING MAJOR

This major provides the academic and practical experience necessary to prepare for certification as an athletic trainer to aid in the prevention, treatment, and rehabilitation of athletic injuries. The Athletic Training major is accredited by the Commission on Accreditation of Athletic Training Education (CAATE). Graduates work as athletic trainers for professional, college and high school athletic teams, in clinics or hospitals, or enter graduate programs for the allied health professions.

EXERCISE AND SPORT SCIENCE MAJOR AND OPTIONS

Applied Exercise and Sport Science Option

This option allows students to individualize their program of study to prepare for a variety of professional goals such as medical school, graduate and professional programs, adult fitness, sport business, athletics, youth programs, and leadership of non-school sports programs for people of all ages.

Fitness and Nutrition Option

This option has a strong focus in exercise physiology, exercise programming, and nutrition. Graduates of the Fitness and Nutrition option provide leadership for organizing, directing, and managing physical fitness programs in business and industrial settings, health clubs, and hospital-based fitness/wellness cardiac rehabilitation programs. This program is excellent preparation for graduate school.

Physical Education

Teacher Education Option

Students seeking careers in teaching physical education would select this option. If you want to teach in an elementary and/or secondary school setting, this program provides the academic major and prerequisites needed for application into the fifth-year, master's-level teacher education program that leads to teaching licensure.

Pre-Therapy and Allied Health Option

Students who choose this option prepare for admission into medical school or a professional training program in the allied health professions. Graduates become physical therapists, occupational therapists, physicians, physician assistants, or nurses.

NUTRITION MAJOR AND OPTIONS

Dietetics Option

Dietitians provide guidance to the public regarding nutrition and diet. The Dietetics option at OSU is accredited by the Accreditation Council for Education in Nutrition and Dietetics (ACEND) of the Academy of Nutrition and Dietetics and prepares students to become Registered Dietitians (RD). This option provides the course work and preparation to enter a supervised dietetic internship, pass the Registered Dietitian Exam, and become a leader in the profession. Graduates from OSU's program consistently exceed the national average for placement into accredited dietetic internships and for passing the RD Exam the first time.

Nutrition and Foodservice Systems Option

This option prepares graduates for professional careers directing foodservice operations that focus on serving healthy menu options and using local ingredients. Foodservice opportunities exist in both non-commercial operations including schools, universities and healthcare, as well as others in the retail environment; all are striving to meet the consumer demand for healthier food options. This program integrates course work taken at OSU and the Culinary Arts program at Linn-Benton Community College.

Nutrition and Health Sciences Option

This option is designed for students who want to focus on the scientific basis of nutrition for careers in medicine and the health sciences or in nutrition science research. Tracks within the option allow students to specifically focus and prepare for careers in medicine and the allied health sciences or for academia and/or health-related research. Professionals trained in nutrition science have many career options due to the growth and aging of our population, the focus on prevention of obesity and other chronic diseases, and a growing emphasis on health, nutrition, and wellness.

UNDERGRADUATE STUDIES

Preparation

Entering first-year and undergraduate transfer students should prepare to enter the College of Public Health and Human Sciences with a strong foundation in the sciences, balanced with good writing and critical thinking skills. Students transferring from other institutions are best prepared for the college curriculum if they have taken chemistry or biology or both.

Admission

Any student who has met the admission requirements of Oregon State University may be admitted to a nutrition or exer-

cise and sport science program of study. To transfer from another OSU college or school, the student must have the approval of the head advisor of the College of Public Health and Human Sciences.

PHYSICAL ACTIVITY COURSES

The Physical Activity Course (PAC) Program is an elective, academic-credit program designed to provide OSU students with the opportunity to learn and engage in a wide variety of physical activities with the goal of promoting health and lifelong participation in physical activity. Students may take any number of PAC credits, but only 11 credits may be counted toward graduation. Successful completion of any PAC section will satisfy the one-credit laboratory requirement of the fitness category of the baccalaureate core. Courses may be repeated for credit and a grade. There is a PAC fee for each class, and some courses have additional fees. All fees are listed in the online *Schedule of Classes*. Student accounts are billed upon registration. Refunds of the PAC fee are automatic upon dropping or withdrawing from the course and follow university policies as listed in the *OSU General Catalog*. Some additional fees are refunded through the PAC Office (Langton 123). Social dance classes are listed with a men's and a women's section in order help balance the number of students in the traditional lead-and-follow roles within the same class.

RETENTION

Students are expected to make satisfactory progress toward a degree. Satisfactory progress includes, but is not limited to:

1. Maintaining a minimum Nutrition and Exercise Sciences option program GPA of 2.25.
2. Maintaining a minimum GPA of 2.50 in all EXSS and NUTR-prefixed courses.

UNDERGRADUATE MAJORS WITH OPTIONS

ATHLETIC TRAINING (BS, CRED, HBS)

The Athletic Training major at Oregon State University is a four-year degree program. The first year is classified as the Pre-Athletic Training year. This Pre-Athletic Training year precedes formal admission into the Athletic Training major. Once admitted to the Athletic Training major, the student will take three years of specialized course work and will complete supervised clinical-educational experiences at an affiliated athletic training facility.

Upon successful completion of the Athletic Training major, the student is eligible to sit for the Board of Certification (BOC) examination. BOC certification (ATC) establishes the entry-level creden-

tial to work as an athletic trainer. Athletic training encompasses the prevention, diagnosis and intervention of emergency, acute and chronic medical conditions involving impairment, functional limitations and disabilities. Athletic trainers work in a variety of settings, including sports medicine clinics, hospitals, high schools, colleges and universities, professional sports teams, and corporate/industrial settings.

The Athletic Training major is transitioning to a master's-level degree, therefore the 2013–2014 academic year is the last year in which students can apply for admission into the undergraduate Athletic Training program. Beginning in 2014–2015, students interested in becoming certified athletic trainers can pursue an undergraduate degree in Exercise and Sport Science and then apply for admission to the master's-level degree in Athletic Training that will be in place upon the completion of the undergraduate degree. Please see the following site for updated information on the transition: <http://health.oregonstate.edu/degrees/athletic-training/graduate>.

Pre-Athletic Training Year

During this year (2013–2014) the student will complete the prerequisite courses and, in early May of 2014, apply for admission into the Athletic Training major. Admission to the Athletic Training major is competitive and based on measures of student performance in both academic and clinical settings.

Application Criteria:

1. Completion of the following prerequisite courses:
EXSS 158. Care and Prevention of Athletic Injuries (3 cr)
EXSS 159. Directed Observation in Athletic Training (1 cr)
CH 121 or CH 221 or (CH 231 and CH 261). General Chemistry (5 cr)^a
PHAR 210. Terminology of the Health Sciences (2 cr)
(**Note:** Students may be in the process of taking one or more of these courses during the Spring term in which they apply.)
2. A minimum OSU GPA of 2.75 on a 4.0 scale.
3. Completion of clinical observation arranged in conjunction with EXSS 159.
4. Completion of admission interview.

Application Information:

The application, official application due date, and the ranking criteria for admission can be found at the Athletic Training major website at <http://health.oregonstate.edu/degrees/athletic-training>.

Athletic Training Major

Following admission into the Athletic Training major, the following course work must be completed. Athletic

training-specific course work must be completed in order as stipulated on the AT major course progression sheet found at <http://health.oregonstate.edu/degrees/athletic-training>.

Baccalaureate Core Requirements (51 credits)

17 of the 51 credits required in the baccalaureate core may be fulfilled by courses in the Athletic Training option and/or major.

Athletic Training Major Courses (85–86 credits)

- EXSS 131. Introduction to Exercise and Sport Science (1)[*Recommended.*]
 EXSS 158. Care and Prevention of Athletic Injuries (3)
 EXSS 159. Directed Observation in Athletic Training (1)
 EXSS 259. Athletic Training Practicum (2)
 EXSS 322. Anatomical Kinesiology (4).
 EXSS 323. Biomechanics of Sport and Exercise (4)
 EXSS 324. Exercise Physiology (4)
 EXSS 325. Fitness Assessment and Exercise Prescription (2)
 EXSS 350. Orthopedic Assessment of Upper Extremity Injuries (4)
 EXSS 351. Orthopedic Assessment of Lower Extremity Injuries (4)
 EXSS 358. Athletic Training Practicum (2)
 EXSS 359. Athletic Training Practicum (2)
 EXSS 365. Emergency Management of Sports Trauma (3)
 EXSS 370. Psychology of Sport and Physical Activity (3)
 EXSS 380. Therapeutic Modalities (4)
 EXSS 385. Therapeutic Exercise (4)
 EXSS 394. Professional Activities: Resistance Training Program Design (2)
 EXSS 410. Internship (12)
 EXSS 411. Movement Skill Learning and Control (3)
 EXSS 444. Adapted Physical Activity (4)
 EXSS 452. Athletic Training Program Management (3)
 EXSS 455. ^Pharmacology in Athletic Training (3)
 H 225. *Social and Individual Health Determinants (4)
 NUTR 240. Human Nutrition (3)
 NUTR 341. Nutrition for Exercise (3)
 PHAR 210. Terminology of the Health Sciences (2)

Science and Social Science Courses (47–48)

Complete a total of 15 credits of chemistry:

- CH 121, CH 122, CH 123 *General Chemistry (5,5,5)
OR
 CH 231, CH 232, CH 233. *General Chemistry (4,4,4) **and** CH 261, CH 262, CH 263. *Laboratory for Chemistry 231, 232, 233 (1,1,1)
 H 100. Introduction to Public Health (4)
 MTH 112. *Elementary Functions (4)
 PH 201. *General Physics (5)
 PSY 201. *General Psychology (3)
 ST 201. Principles of Statistics (4)
 or ST 351. Introduction to Statistical Methods (4)

- or H 220. Introduction to Health Data Analysis (3)
 Z 331, Z 332, Z 333. Human Anatomy and Physiology (3,3,3)
 Z 341, Z 342. Human Anatomy and Physiology Lab (2,2)

Electives:

Additional electives to complete a total of 180 credits required for the bachelor of science degree.

Total=180 credits

Footnotes:

* All 15 credits of the required series of chemistry courses must be completed prior to admission to the Athletic Training major.

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

Pre-Athletic Training (Major code 248)

Professional Athletic Training (Major code 244)

EXERCISE AND SPORT SCIENCE (BS, CRED, HBS)

The exercise and sport science curriculum meets university requirements for the bachelor's degree and provides general education needed for professional preparation. Undergraduate major students complete the general baccalaureate core requirements and an option selected from applied exercise and sport science, fitness and nutrition, physical education teacher education, and pre-therapy and allied health. **Note:** The Exercise and Sport Science option is the only option available at the OSU-Cascades Campus.

The bachelor's degree in Exercise and Sport Science can serve as direct preparation for such careers as organizing, directing or managing physical fitness programs. It can also serve as preparation for applications to a master's level physical education teacher education program, medical school, a professional program in the allied health professions (e.g. physical or occupational therapy, nursing, physician assistant) or other graduate education.

Baccalaureate Core Requirements (48)

Skills

- Fitness (3)
 Mathematics (3)
 Speech (3)
 Writing I (3)
 Writing II (3)
 Writing Intensive Course

Perspectives

- Biological science (lab) (4)
 Physical science (lab) (4)
 Plus an additional 4 credits from another biological or physical science lab
 Cultural diversity (3)
 Literature and the arts (3)
 Social processes and institutions (3)
 Western culture (3)

Difference, power and discrimination (3)

Synthesis

- Contemporary global issues (3)
 Science, technology, and society (3)

OPTIONS

APPLIED EXERCISE AND SPORT SCIENCE OPTION

Also available at

OSU-Cascades Campus

The Applied Exercise and Sport Science option allows students to develop an academic experience designed to meet very specific career goals that are not met by one of the other three options.

Curriculum requirements for the four-year program are listed below:

Baccalaureate Core Requirements (48)

17 of the 48 credits required in the baccalaureate core may be fulfilled by courses in the Applied Exercise and Sport Science option.

Applied Exercise and Sport Science Option Courses (53–60)

- EXSS 131. Introduction to Exercise and Sport Science (1)^a
 EXSS 307. Seminar (Sect. 2, Pre-Internship) (1)
 EXSS 312. *Sociocultural Dimensions of Physical Activity (3)
 EXSS 322. Anatomical Kinesiology (4)
 EXSS 323. Biomechanics of Sport and Exercise (4)
 EXSS 324. Exercise Physiology (4)
 EXSS 325. Fitness Assessment and Exercise Prescription (2)
 EXSS 333, EXSS 334. Exercise and Sport Science Practicum (2,2)^b
 EXSS 370. Psychology of Sport and Physical Activity (3)
 EXSS 381. ^Analysis of Critical Issues in Exercise and Sport Science (3)
 EXSS 410. Internship (9–15)
 EXSS 411. Movement Skill Learning and Control (3)
 EXSS 444. Adapted Physical Activity (4)
 Additional EXSS course work (9)^c

Supporting Courses (27)

The courses taken in the Applied Option Courses and Supporting Courses should be integrated into a coherent program based on the goals of the student and should be planned and agreed on by the student and the student's academic advisor. The program of study must be approved by one of the school co-directors.

Science and Social Science Courses (49–51)

- CH 121. General Chemistry (5)
 CH 122. *General Chemistry (5)
and CH 123. *General Chemistry (5)
 or CH 130. General Chemistry of Living Systems (4)

OR:

- CH 231, CH 232, CH 233. *General Chemistry (4,4,4)

and CH 261, CH 262, CH 263.

*Laboratory for Chemistry 231, 232, 233 (1,1,1)

H 100. Introduction to Public Health (4)

H 220. Introduction to Health Data Analysis (3)

or ST 351. Introduction to Statistical Methods (4)

or ST 201. Principles of Statistics (4)

MTH 112. *Elementary Functions (4)

NUTR 240. Human Nutrition (3)

or NUTR 225. General Human Nutrition (3)

PH 201. *General Physics (5)

PSY 201. *General Psychology (3)

Z 331, Z 332, Z 333. Human Anatomy and Physiology (3,3,3)

Z 341, Z 342. Human Anatomy and Physiology Lab (2,2)

Total=160–186

Courses listed under Applied EXSS Option Courses, Supporting Courses, and Science and Social Science Courses must be taken in the normal grading basis, A–F, except for EXSS 131, which is graded P/N.

Students must select additional electives to complete a total of 180 credits required for the bachelor's degree.

Footnotes:

^a Recommended course

^b It is strongly recommended that students also take EXSS 335.

^c EXSS 131 may be used to satisfy 1 of these 9 credits.

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

FITNESS AND NUTRITION OPTION

This option combines a strong focus in exercise physiology and exercise programming with a foundation in nutrition. It uniquely prepares graduates to provide leadership for organizing, directing, and managing physical fitness programs in business and industrial settings, health clubs, and hospital-based fitness/wellness cardiac rehabilitation programs. Graduates can earn professional certifications in fitness and conditioning. The program is also excellent preparation for graduate school.

Curriculum requirements for the four-year program are listed below:

Baccalaureate Core Requirements (48)

Selected required courses within the option may be used toward these requirements.

Exercise Science Courses (58–67)

EXSS 131. Introduction to Exercise and Sport Science (1)[*Recommended.*]

EXSS 307. Seminar (Sect. 2, Pre-Internship) (1)

EXSS 322. Anatomical Kinesiology (4)

EXSS 323. Biomechanics of Sport and Exercise (4)

EXSS 324. Exercise Physiology (4)

EXSS 325. Fitness Assessment and Exercise Prescription (2)

EXSS 333. Exercise and Sport Science Practicum (2)

and EXSS 335. Exercise and Sport Science Practicum (2)[*Strongly recommended.*]

EXSS 370. Psychology of Sport and Physical Activity (3)

EXSS 381. ^Analysis of Critical Issues in EXSS (3)

EXSS 410. Internship (9–15)

EXSS 434. Applied Muscle Physiology (3)

EXSS 435. Physical Activity Promotion (3)

EXSS 436. Exercise Management of Chronic Disease (3)

EXSS 474. Exercise Physiology Lab Methods (2)

Choose at least two of the following:

EXSS 394. Professional Activities: Resistance Training Program Design (2)

EXSS 395. Professional Activities: Group Fitness (2)

EXSS 396. Professional Activities: Aquatics (2)

Choose at least three courses from the following list:

EXSS 158. Care and Prevention of Athletic Injuries (3)

EXSS 312. *Sociocultural Dimensions of Physical Activity (3)

EXSS 313. Lifespan Motor Development (4)

EXSS 411. Movement Skill Learning and Control (3)

EXSS 414. Physical Activity and Aging (3)

EXSS 444. Adapted Physical Activity (4)

EXSS 475. *Power and Privilege in Sport (3)

Human Nutrition Courses (13)

NUTR 240. Human Nutrition (3)

NUTR 241. Applications in Human Nutrition (1)

NUTR 312. *Issues in Nutrition and Health (3)

NUTR 325. Nutrition Through the Life Cycle (3)

NUTR 341. Nutrition for Exercise (3)

Science and Social Science Courses (46–48)

CH 121. General Chemistry (5)

CH 122. *General Chemistry (5)

CH 123. *General Chemistry (5)

or CH 130. General Chemistry of Living Systems (4)

OR:

CH 231, CH 232, CH 233. *General Chemistry (4,4,4)

and CH 261, CH 262, CH 263.

*Laboratory for Chemistry 231, 232, 233 (1,1,1)

H 100. Introduction to Public Health (4)

H 220. Introduction to Health Data Analysis(3)

or ST 351. Introduction to Statistical Methods (4)

or ST 201. Principles of Statistics (4)

MTH 112. *Elementary Functions (4)

PH 201. *General Physics (5)

PSY 201. *General Psychology (3)

Z 331, Z 332, Z 333. Human Anatomy and Physiology (3,3,3)

Z 341, Z 342. Human Anatomy and Physiology Lab (2,2)

Supporting Courses (12)

PHL 205. *Ethics (4)

PHAR 210. Terminology of the Health Sciences (2)

Choose at least one of the following:

COMM 111. *Public Speaking (3)

COMM 114. *Argument and Critical Discourse (3)

COMM 218. *Interpersonal Communication (3)

Choose at least one of the following:

COMM 324. Communication in Organizations (3)

COMM 326. Intercultural Communication (3)

COMM 432. Gender and Communication (3)

All of the above-listed courses must be taken on an A–F grading basis, except for those that satisfy the baccalaureate core but not the major, and EXSS 131, which is graded P/N.

Students must select additional elective credits to complete a total of 180 credits required for the bachelor's degree. Students are encouraged to consult with an advisor or faculty member in choosing electives.

Suggested Electives

BA 215. Fundamentals of Accounting (4)

BA 230. Business Law I (4)

BA 260. Introduction to Entrepreneurship (4)

BA 351. Managing Organizations (4)

BB 350. Elementary Biochemistry (4)

CH 331, CH 332. Organic Chemistry (4,4)

EXSS 335. Exercise and Sport Science Practicum (2)

H 225. *Social and Individual Health Determinants (4)

H 312. *AIDS and STDs in Modern Society (3)

H 320. Introduction to Human Disease (3)

MB 230. *Introductory Microbiology (4)

or BB 331. *Introduction to Molecular Biology (3)

PHL 444. *Biomedical Ethics (4)

SOC 454. *Leisure and Culture (4)

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

PHYSICAL EDUCATION TEACHER EDUCATION OPTION

For students who seek careers teaching physical education in an elementary and/or secondary school setting, this option provides the academic major and prerequisites needed for application into the fifth-year master's level teacher education program that leads to teaching licensure.

Curriculum requirements for the four-year program are listed below:

Baccalaureate Core Requirements (48)

20 of the 48 credits required in the baccalaureate core may be fulfilled by courses in the Physical Education Teacher Education option.

Physical Education Teacher**Education Option Courses (72–73)**

- EXSS 131. Introduction to Exercise and Sport Science (1)^a
- EXSS 158. Care and Prevention of Athletic Injuries (3)
- EXSS 194. Professional Activities: Basic Rhythms (1)
- EXSS 312. *Sociocultural Dimensions of Physical Activity (3)
- EXSS 313. Lifespan Motor Development (4)
- EXSS 322. Anatomical Kinesiology (4)
- EXSS 323. Biomechanics of Sport and Exercise (4)
- EXSS 324. Exercise Physiology (4)
- EXSS 353. EXSS 354, EXSS 355. Physical Education Teacher Education Practicum (2,2,2)
- EXSS 360. Sport Skill Analysis I (2)
- EXSS 361. Sport Skill Analysis II (2)
- EXSS 362. Sport Skill Analysis III (2)
- EXSS 370. Psychology of Sport and Physical Activity (3)
- EXSS 371. Measurement and Data Analysis in Exercise Science (4)
- EXSS 381. ^Analysis of Critical Issues in EXSS (3)
- EXSS 394. Professional Activities: Resistance Training Program Design (2)
- EXSS 395. Professional Activities: Group Fitness (2)
- EXSS 396. Professional Activities: Aquatics (2)
- EXSS 411. Movement Skill Learning and Control (3)
- EXSS 420. Physical Activity for Children (3)
- EXSS 421. Physical Activity for Adolescents (3)
- EXSS 444. Adapted Physical Activity (4)
- PAC courses approved by advisor (8)
- PAC courses in different activities required to reflect content taught in public schools and other physical activity settings, including fitness games and sports, outdoor leisure pursuits and aquatics.

Supporting Courses (12–17)

- PSY 350. Human Lifespan Development (3)
or HDFS 311. Infant and Child Development (4) **and** HDFS 313. Adolescent Development (4)
- TCE 216. *Purpose, Structure, and Function of Education in a Democracy (3)
- TCE 219. Civil Rights and Multicultural Issues in Education (3)
- TCE 253. Learning Across the Lifespan (3)

Science and Social Science Courses (46–47)**Choose one CH series below:**

- CH 121. General Chemistry (5), CH 122. *General Chemistry (5)
and CH 123. *General Chemistry (5) or CH 130. General Chemistry of Living Systems (4)

OR:

- CH 231, CH 232, CH 233. *General Chemistry (4,4,4)
and CH 261, CH 262, CH 263.
*Laboratory for Chemistry 231, 232, 233 (1,1,1)
- H 100. Introduction to Public Health (4)
- MTH 112. *Elementary Functions (4)
- NUTR 240. Human Nutrition (3)
or NUTR 225. General Human Nutrition (3)

- PH 201. *General Physics (5)
- PSY 201. *General Psychology (3)
- Z 331, Z 332, Z 333. Human Anatomy and Physiology (3,3,3)
- Z 341, Z 342. Human Anatomy and Physiology Lab (2,2)

All of the above-listed courses must be taken on an A-F grading basis, except for those that satisfy the baccalaureate core but not the major, and EXSS 131, which is graded P/N.

Students must select additional electives to complete a total of 180 credits required for the bachelor's degree.

Footnotes:

- ^a Recommended course
* = Baccalaureate Core Course
^ = Writing Intensive Course (WIC)

PRE-THERAPY AND ALLIED HEALTH OPTION

This program is designed for students interested in pursuing admission into medical school or a professional program in the allied health professions, such as nursing, occupational therapy, physical therapy, or physician assistant.

The Pre-Therapy and Allied Health option requires the completion of one of five professional tracks:

1. Pre-Medicine
2. Pre-Nursing
3. Pre-Occupational Therapy
4. Pre-Physical Therapy
5. Pre-Physician Assistant

Curriculum requirements for the four-year program are listed below.

Baccalaureate Core Requirements (48)

Selected required courses within the option may be used toward these requirements.

Pre-Therapy and Allied Health Option Required EXSS Courses (32)

- EXSS 132. Introduction to the Allied Health Professions (1)
or BI 109. Health Professions: Medical (1) [for Pre-Med]
- EXSS 312. *Sociocultural Dimensions of Physical Activity (3)
- EXSS 322. Anatomical Kinesiology (4)
- EXSS 323. Biomechanics of Sport and Exercise (4)
- EXSS 324. Exercise Physiology (4)
- EXSS 325. Fitness Assessment and Exercise Prescription (2)
- EXSS 343. Pre-Therapy/Allied Health Seminar (1)
or GS 410. Science Internship (1–12) [for Pre-Med]
- EXSS 370. Psychology of Sport and Physical Activity (3)
- EXSS 381. ^Analysis of Critical Issues in Exercise and Sport Science (3)
- EXSS 411. Movement Skill Learning and Control (3)
- EXSS 444. Adapted Physical Activity (4)

PTAH Option Supporting Courses for All Tracks (29–34)

- H 100. Introduction to Public Health (4)
- NUTR 240. Human Nutrition (3)

- PHAR 210. Terminology of the Health Sciences (2)
- PSY 201, PSY 202. *General Psychology (3,3)
- SOC 204. *Introduction to Sociology (3)

Choose one of the following communication courses:

- COMM 111. *Public Speaking (3)
- COMM 114. *Argument and Critical Discourse (3)
- COMM 218. *Interpersonal Communication (3)

Choose four of the following EXSS supporting courses:

- EXSS 158. Care and Prevention of Athletic Injuries (3)
- EXSS 313. Lifespan Motor Development (4)
- EXSS 360. Sport Skill Analysis I (2)
or EXSS 361. Sport Skill Analysis II (2)
- EXSS 394. Professional Activities: Resistance Training Program Design (2)
- EXSS 395. Professional Activities: Group Fitness (2)
- EXSS 396. Professional Activities: Aquatics (2)
- EXSS 414. Physical Activity and Aging (3)
- EXSS 434. Applied Muscle Physiology (3)
- EXSS 436. Exercise Management of Chronic Disease (3)
- EXSS 455. ^Pharmacology in Athletic Training (3)

PTAH Option Science Core for All Tracks (42–43)

- CH 121. General Chemistry (5)
and CH 122, CH 123. *General Chemistry (5,5)
OR: CH 231, CH 232, CH 233. *General Chemistry (4,4,4)
and CH 261, CH 262, CH 263.
*Laboratory for Chemistry 231, 232, 233 (1,1,1)

- MTH 112. *Elementary Functions (4)
- PH 201. *General Physics (5)
- ST 351. Introduction to Statistical Methods (4)
or ST 201. Principles of Statistics (3)
- Z 331, Z 332, Z 333. Human Anatomy and Physiology (3,3,3)
- Z 341, Z 342, Z 343. Human Anatomy and Physiology Lab (2,2,2)

All courses above must be taken in the normal grading basis, A-F.

Important note: To enroll in EXSS 343 and EXSS 344, a student must meet the following prerequisites:

- EXSS 132, Introduction to the Allied Health Professions (1), with a grade of C or better.
- Z 331, Z 332, Z 333, Z 341, Z 342, and Z 343 with a grade of C or better in each course and a GPA of 2.7 or greater across the 6-course series.
- Overall GPA of 3.0 or greater.
- Instructor or school approval.

Additional required science and social science courses for the following pre-professional tracks are listed farther below:

1. Pre-Medicine
2. Pre-Nursing
3. Pre-Occupational Therapy

4. Pre-Physical Therapy
5. Pre-Physician Assistant.

PTAH Option Suggested Electives for All Tracks:

ANTH 483. Advanced Medical Anthropology (4)
 BB 350. Elementary Biochemistry (4)
 BI 311. Genetics (4)
 CH 331, CH 332. Organic Chemistry (4,4)
 CH 337. Organic Chemistry Lab (4)
 H 210. *Introduction to the Health Care System (4)
 H 225. *Social and Individual Health Determinants (4)
 H 250. Introduction to Health Care Management (3)
 H 312. *AIDS and STDs in Modern Society (3)
 H 320. Introduction to Human Disease (3)
 MB 230. *Introductory Microbiology (4)
 NUTR 312. *Issues in Nutrition and Health (3)
 PHL 205. *Ethics (4)
 PHL 444. *Biomedical Ethics (4)
 PSY 330. Brain and Behavior (4)
 PSY 350. Human Lifespan Development (4)
 PSY 381. Abnormal Psychology (4)
 PSY 432. Physiological Psychology (4)
 PSY 442. Perception (4)
 SOC 205. *Institutions and Social Change (3)
 SOC 340. Deviant Behavior and Social Control (4)

- Students must complete a total of 180 credits required for a degree.
- It is strongly suggested that students examine prerequisite requirements for professional schools and utilize elective credits to meet additional requirements.
- Students may complete foreign language credits as elective credits.
- It is strongly suggested that the "Suggested Elective" courses listed above and the track-specific required courses listed below also be taken in the normal grading basis, A–F.

1. Pre-Medicine Science and Social Science Courses (54)

BB 450. General Biochemistry (4)
 BB 451. General Biochemistry Lab (3)
 BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)
 BI 314. Cell and Molecular Biology (4)
 CH 331, CH 332. Organic Chemistry (4,4)
 CH 337. Organic Chemistry Lab (4)
 MB 302. General Microbiology (3)
 MB 303. General Microbiology Lab (2)
 MTH 251. *Differential Calculus (4)
 PH 202, PH 203. *General Physics (5,5)

Total Required Courses/Credits for Pre-Medicine Option

PTAH Option Required EXSS Course Work (32–43)

PTAH Option Required Science Course Work (42–43)

PTAH Option Supporting Course Work (29–34)

Pre-Medicine Science/Social Science (54)

Total = 157–174

2. Pre-Nursing Science and Social Science Courses (26)

H 225. *Social and Individual Health Determinants (4)

H 312. *AIDS and STDs in Modern Society (3)

H 320. Introduction to Human Disease (3)

MB 230. *Introductory Microbiology (4)

PHL 205. *Ethics (4)

PHL 444. *Biomedical Ethics (4)

Choose one of the following psychology courses:

PSY 330. Brain and Behavior (4)

PSY 350. Human Lifespan Development (4)

PSY 381. Abnormal Psychology (4)

Total Required Courses/Credits for Pre-Nursing Option

PTAH Option Required EXSS Course Work (32)

PTAH Option Required Science Course Work (42–43)

PTAH Option Supporting Course Work (29–34)

Pre-Nursing Science/Social Science Track Course Work (26)

Total = 129–135

3. Pre-Occupational Therapy Science and Social Science Courses (44–45)

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

or BI 101, BI 102, BI 103. *General Biology (4,4,4)

EXSS 344. Pre-Therapy/Allied Health Practicum (2)

EXSS 380. Therapeutic Modalities (4)

EXSS 385. Therapeutic Exercise (4)

Choose one of the following medical/health related courses:

H 225. *Social and Individual Health Determinants (4)

H 312. *AIDS and STDs in Modern Society (4)

H 320. Introduction to Human Disease (4)

PHL 444. *Biomedical Ethics (4)

PH 202. *General Physics (5)

Choose two of the following psychology courses:

PSY 330. Brain and Behavior (4)

PSY 350. Human Lifespan Development (4)

PSY 381. Abnormal Psychology (4)

Applied Art Courses (take 6 credits) (6)

Total Required Courses/Credits for Pre-Occupational Therapy Option

PTAH Option Required EXSS Course Work (32)

PTAH Option Required Science Course Work (42–43)

PTAH Option Supporting Course Work (29–34)

Pre-Occupational Therapy Science/Social Science Course Work (44–45)

Total = 147–154

4. Pre-Physical Therapy Science and Social Science Courses (43–44)

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

EXSS 344. Pre-Therapy/Allied Health Practicum (2)

EXSS 380. Therapeutic Modalities (4)

EXSS 385. Therapeutic Exercise (4)

Choose one of the following medical/health related courses:

H 225. *Social and Individual Health Determinants (4)

H 312. *AIDS and STDs in Modern Society (3)

H 320. Introduction to Human Disease (3)

PHL 444. *Biomedical Ethics (4)

PH 202, PH 203. *General Physics (5,5)

Choose two of the following psychology courses:

PSY 330. Brain and Behavior (4)

PSY 350. Human Lifespan Development (4)

PSY 381. Abnormal Psychology (4)

Total Required Courses/Credits for Pre-Physical Therapy Option

PTAH Option Required EXSS Course Work (32)

PTAH Option Required Science Course Work (42–43)

PTAH Option Supporting Course Work (29–34)

Pre-Physical Therapy Science/Social Science (43–44)

Total = 146–153

5. Pre-Physician Assistant Science and Social Science Courses (45–46)

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

BI 314. Cell and Molecular Biology (4)

CH 331, CH 332. Organic Chemistry (4,4)

CH 337. Organic Chemistry Lab (4)

Choose one of the following medical/health related courses:

H 225. *Social and Individual Health Determinants (4)

H 312. *AIDS & STDs in Modern Society (4)

H 320. Introduction to Human Disease (4)

PHL 444. *Biomedical Ethics (4)

MB 230. *Introductory Microbiology (4)

PH 202, PH 203. *General Physics (5,5)

Total Required Courses/Credits for Pre-Physician Assistant Option

PTAH Option Required EXSS Course Work (36)

PTAH Option Required Science Course Work (42–43)

PTAH Option Supporting Course Work (29–34)

Pre-Physician Assistant Science/Social Science (45–46)

Total = 148–155

NUTRITION (BS, CRED, HBS)

Baccalaureate Core (48)

Plus choose one option from below:

1. Pre-Dietetics
2. Dietetics (must first complete Pre-Dietetics)
3. Nutrition and Foodservice Systems
4. Nutrition and Health Sciences

OPTIONS

PRE-DIETETICS OPTION

Dietetics Admission Requirements
 To be considered for admission to the Dietetics option within the Nutrition major, students must complete the Pre-Dietetics courses listed below with a grade of B– or higher in each of the NUTR courses listed, a grade of C– or higher in each of the other courses listed, and a grade-point average of 3.0 or higher for the listed courses as a whole. Applicants

to the Dietetics option must achieve an overall GPA of 3.0 or higher based on completing at least 60 quarter credits [OSU (institutional) and transfer], including the prerequisite courses listed below. At least 12 credits must be taken at OSU.

Information on how to apply for admission to the Dietetics option can be found at the PHHS Advising Office and on the BPHS Nutrition Dietetics Web page at <http://health.oregonstate.edu/bphs/dietetics>.

- BI 212. *Principles of Biology (4)
 CH 121. General Chemistry (5)
 CH 122, CH 123. *General Chemistry (5,5)
 or CH 231, CH 232, CH 233. *General Chemistry (4,4,4) **and** CH 261, CH 262, CH 263. *Laboratory for Chemistry 231, 232, 233 (1,1,1)
 CH 331. Organic Chemistry (4)
 or CH 334. Organic Chemistry (3)
 H 100. Introduction to Public Health (4)
 MB 230. *Introductory Microbiology (4)
 or MB 302, MB 303. General Microbiology and Lab (3,2)
 NUTR 104. Orientation: Nutrition and Food Management (1)
 NUTR 240. Human Nutrition (3)
 NUTR 241. Applications in Human Nutrition (1)
 NUTR 325. Nutrition Through the Life Cycle (3)
 PSY 201. *General Psychology (3)
 WR 121. *English Composition (3)

Total=40-42

DIETETICS OPTION

Meets the Academy of Nutrition and Dietetics' academic and accreditation requirements.

Before taking the Dietetics option, students must first complete the Pre-Dietetics option.

Dietetics Admission Requirements
 Students must apply to and be accepted into the Dietetics option in Nutrition. See pre-dietetics courses and Dietetics Admission Requirements.

- BA 351. Managing Organizations (4)
 BB 350. Elementary Biochemistry (4)
 CH 332. Organic Chemistry (4)
 or CH 335, CH 336. Organic Chemistry (3,3)
 COMM 111. *Public Speaking (3)
 or COMM 114. *Argument and Critical Discourse (3)
 EXSS 324. Exercise Physiology (4)
 H 100. Introduction to Public Health (4)
 H 320. Introduction to Human Disease (3)
 NUTR 235. Science of Foods (5)
 NUTR 311. Foodservice Production and Purchasing (4)
 NUTR 319. Promoting Food and Nutrition (3)
 NUTR 325. Nutrition Through the Life Cycle (3)
 NUTR 340. Principles in Nutrient Metabolism (3)
 NUTR 407. Seminar (2)
 NUTR 417, NUTR 418. Human Nutrition Science (4,4)

- NUTR 419. Human Nutrition Laboratory (3)
 NUTR 420. Medical Nutrition Therapy (5)
 NUTR 423. Community Nutrition (4)
 NUTR 439. ^Communications in Dietetics (3)
 NUTR 446. Foodservice Organizations (4)
 NUTR 447. Management of Food Systems Lab (3)
 PSY 202. *General Psychology (3)
 ST 351. Introduction to Statistical Methods (4)
 Z 331, 332, Z 333. Human Anatomy and Physiology (3,3,3)
 Z 341, 342, Z 343. Human Anatomy and Physiology Lab (2,2,2)

Electives

Sufficient (together with baccalaureate and nutrition and food management cores) to ensure 180 total credits (60 must be upper division).

Footnotes:

- * Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

NUTRITION AND FOODSERVICE SYSTEMS OPTION

The Nutrition and Foodservice Systems option prepares graduates for professional careers directing foodservice operations that focus on serving healthy menu options and using local ingredients. Foodservice opportunities exist in both non-commercial operations including schools, universities and healthcare as well as others in the retail environment; all are striving to meet the consumer demand for healthier food options. This program integrates course work taken at OSU and the Culinary Arts program at Linn-Benton Community College.

Please contact Dr. Mary M. Cluskey, 541-737-0960, cluskeym@oregonstate.edu for more information about the Nutrition and Foodservice Systems option.

Introductory Core

- H 100. Introduction to Public Health (4)
 NUTR 104. Orientation: Nutrition and Food Management (1)
 or CA 201. Culinary Arts Career Planning (1) (LBCC)
 NUTR 240. Human Nutrition (3)
 NUTR 241. Applications in Human Nutrition (1)
 NUTR 325. Nutrition Through the Life Cycle (3)
 CA 101. Culinary Arts Practicum I (7) (LBCC)
 CA 102. Culinary Arts Practicum II (8) (LBCC)
 CA 103. Culinary Arts Practicum III (8) (LBCC)

General Education Core

- CH 121. General Chemistry (5)
 COMM 218. *Interpersonal Communication (3)
 or COMM 111. *Public Speaking (3)
 ECON 201. *Introduction to Microeconomics (4)
 ECON 202. *Introduction to Macroeconomics (4)
 H 320. Introduction to Human Disease (3)
 H 385. Safety and Health Standards and Laws (3)

- or H 344. Foundations of Environmental Health (3)
 MB 230. *Introductory Microbiology (4)
 or MB 302, MB 303. General Microbiology, General Microbiology Lab (3,2)
 PSY 202. *General Psychology (3)
 ST 201. Principles of Statistics (4)
 or ST 351. Introduction to Statistical Methods (4)

Healthy Foodservice

Systems Courses

- BA 215. Fundamentals of Accounting (4)
 BA 230. Business Law I (4)
 BA 351. Managing Organizations (4)
 BA 360. Introduction to Financial Management (4)
 BA 390. Marketing (4)
 BA/MGMT 453. Human Resources Management (4)
 CA 111. Food Service Safety and Sanitation (1) (LBCC)
 CA 112. Stations, Tools, and Culinary Techniques (3) (LBCC)
 CA 113. Service Techniques (1) (LBCC)
 FST 251. Introduction to Wines, Beers and Spirits (3)
 FST 360. Food Safety and Sanitation (3)
 FST 421. *Food Law (3)
 NUTR 311. Foodservice Production and Purchasing (4)
 NUTR 319. Promoting Food and Nutrition (3)
 NUTR 407. Seminar (1)¹
 NUTR 410. Field Experience (8)² *Pre-arrange NUTR 410 with department*
 NUTR 416. ^Cultural Aspects of Foods (3)
 NUTR 446. Managing Food and Nutrition Services (4)
 NUTR 447. Management of Food Systems Laboratory (3)

Credits needed to graduate=180

Upper-division credits needed=60

Maximum S/U credits=36

Note: Departmental courses within major may not be taken S/U.

Transfer Students: See Schedule of Classes, Academic Regulations 18a.1.

Footnotes:

- * Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)
¹ Recommend fall term of senior year.
² Recommend spring term of senior year.

NUTRITION AND HEALTH SCIENCES OPTION

The Nutrition Science and Health Sciences option is designed for students who want to focus in the scientific basis of nutrition for careers in medicine and the health sciences or in nutrition science research. Tracks within the option allow students to specifically focus and prepare for careers in medicine and the allied health sciences or for academia and/or health-related research. Professionals trained in nutrition science have many career options due to the growth and aging of our population, the focus on prevention of obesity and other chronic diseases, and a growing emphasis on health, nutrition, and wellness.

Science/Social Science Core**(all Tracks) (105 credits):**

BB 450, BB 451. General Biochemistry (4,3)
 BI 211, BI 212, BI 213. *Principles of
 Biology (4,4,4)

BI 314. Cell and Molecular Biology (4)

CH 121, CH 122, CH 123. *General
 Chemistry (5,5,5)
 or CH 231, CH 232, CH 233. *General
 Chemistry (4,4,4)

and CH 261, CH 262, CH 263.

*Laboratory for Chemistry 231, 232, 233
 (1,1,1)

CH 331, CH 332, Organic Chemistry (4,4)
 or CH 334, CH 335, CH 336. Organic
 Chemistry (3,3,3)

CH 337. Organic Chemistry Laboratory (4)

COMM 111. *Public Speaking (3)

or COMM 114. *Argument and Critical
 Discourse (3)

or COMM 218. Interpersonal
 Communication (3)

EXSS 324. Exercise Physiology (4)

H 100. Introduction to Public Health (4)

MB 302, MB 303. General Microbiology and
 Lab (3,2)

MTH 112. *Elementary Functions (4)

PH 201, PH 202. *General Physics (5,5)

PSY 201, PSY 202. *General Psychology (3,3)

ST 351. Introduction to Statistical Methods
 (4)

WR 121. *English Composition (3)

Z 331, Z 332, Z 333. Human Anatomy and
 Physiology (3,3,3)

Z 341, Z 342, Z 343. Human Anatomy and
 Physiology laboratory (2,2,2)

Nutrition Core (All Tracks)**(27–30 credits):**

NUTR 240. Human Nutrition (3)

NUTR 241. Applications in Human
 Nutrition (1)

NUTR 325. Nutrition Through the Life
 Cycle (3)

NUTR 340. Principles in Nutrient
 Metabolism (3)

NUTR 417, NUTR 418. Human Nutrition
 Science (4,4)

NUTR 439. ^Communications in Dietetics (3)

Choose two courses from below:

NUTR 312. *Issues in Nutrition and Health
 (3)

NUTR 419. Human Nutrition Laboratory
 (3)

NUTR 420. Medical Nutrition Therapy (5)

NUTR 423. Community Nutrition (4)

Nutrition Science Track (7 credits):

CH 324. Quantitative Analysis (4)

NUTR 104. Orientation: Nutrition and Food
 Management (1)

NUTR 401. Research (min. 2 credits)

Suggested Electives

BI 311. Genetics (4)

H 320. Introduction to Human Disease (3)

MTH 251. *Differential Calculus (4)

NUTR 235 Science of Foods (5)

PHAR 210. Terminology of the Health
 Sciences (2)

PSY 350. Human Lifespan Development (3)

**Physician Assistant and
Pre-Med Track: (11 credits)**

EXSS 132. Introduction to the Allied Health
 Professions (1)

or BI 109. Health Professions: Medical (1)

EXSS 325. Fitness Assessment and Exercise
 Prescription (2)

EXSS 343. Pre-Therapy/Allied Health
 Seminar (1)

or #GS 410. Science Internship (1) (For
 Pre-Med Students)

PH 203. *General Physics (5)

PHAR 210. Terminology of the Health
 Sciences (2)

Suggested Electives

#BI 311. Genetics (4)

H 320. Introduction to Human Disease (3)

#MTH: Requirement varies between
 schools

PHL 444. *Biomedical Ethics (4)

PSY 330. Brain and Behavior (3)

PSY 350. Human Lifespan Development (3)

PSY 381. Abnormal Psychology (3)

Additional Suggested Electives

ANTH 483. Advanced Medical

Anthropology (4)

EXSS 322. Anatomical Kinesiology (4)

H 210. *Introduction to the Health Care
 System (3)

H 225. *Social and Individual Health
 Determinants (4)

H 312. *AIDS and Sexually Transmitted
 Diseases in Modern Society (3)

NUTR 312. *Issues in Nutrition and Health (3)

PSY 432. Physiological Psychology (3)

Total Credits=Sufficient (together with
 baccalaureate and NUTR cores) to ensure
 180 total credits (60 credits must be up-
 per division).

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

Requirement for Pre-Med or MCAT
 preparation

UNDERGRADUATE MINORS**ENVIRONMENTAL SAFETY
AND HEALTH MINOR****Required Courses (25)**

H 320. Introduction to Human Disease (3)

H 344. Foundations of Environmental
 Health (3)

H 385. Safety and Health Standards and
 Laws (3)

H 407. Seminar (1)

H 410. Internship (12)

H 425. Foundations of Epidemiology (3)

**Select two courses listed below for 6
credits:**

H 445. *Occupational Health (3)

H 448. Public Health Toxicology and Risk
 Assessment (3)

H 489. Emergency and Disaster
 Management (3)

H 494. Applied Ergonomics (3)

H 495. Design for Environment, Safety,
 and Health (3)

Note: Students should also take SOIL
 205, *Soil Science (4), as part of their
 major program.

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

EXERCISE PHYSIOLOGY MINOR

Students pursuing this minor develop
 a deeper understanding of the motiva-
 tional, psychosocial, and lifespan factors
 affecting human behavior within the
 context of sport and physical activity
 settings. A theory-to-research-to-practice
 approach is followed in the core course
 work, with supplemental course work
 focusing on the individual needs and
 interests of the students.

EXSS 322. Anatomical Kinesiology (4)

EXSS 324. Exercise Physiology (4)

EXSS 325. Fitness Assessment and Exercise
 Prescription (2)

EXSS 406. Projects (Athletic Administration)
 (3)

EXSS 434. Applied Muscle Physiology (3)

EXSS 436. Exercise Management for
 Chronic Disease (3)

EXSS 474. Exercise Physiology Lab Methods (2)

Z 331, Z 332, Z 333. Human Anatomy and
 Physiology (3,3,3)

Z 341. Human Anatomy and Physiology Lab (2)

Note: Prerequisites for EXSS 324 are Z
 333 and CH 121 and CH 122 and (CH
 123 or CH 130) and Z 331 or equivalent.

Total=32

NUTRITION MINOR

This minor requires 34 credits, including
 12 credits at the upper-division level.

Students are strongly encouraged to
 consult an advisor in the School of Bio-
 logical and Population Health Sciences to
 be sure that prerequisites are taken.

BB 450, BB 451. General Biochemistry (4,3)

NUTR 240. Human Nutrition (3)

NUTR 241. Applications in Human Nutrition (1)

NUTR 325. Nutrition Through the Life Cycle (3)

NUTR 340. Principles in Nutrient
 Metabolism (3)

NUTR 417, NUTR 418. Human Nutrition
 Science (4,4)

Z 331, Z 332, Z 333. Human Anatomy and
 Physiology (3,3,3)

**EXERCISE AND SPORT SCIENCE
(MS, PhD, MAIS)****Graduate Areas of Concentration**

*Exercise physiology, movement studies
 in disability, neuromechanics, physical
 activity and public health, sport and
 exercise psychology, sport pedagogy
 (MS only)*

The graduate program in exercise and
 sport science offers courses and learning
 experiences in the theoretical and practi-
 cal study of physical activity (including
 exercise and sport) for the promotion of
 optimal health and disease prevention.
 Graduate fields in exercise and sport sci-
 ence include exercise physiology, move-
 ment studies in disability, neuromechan-
 ics, physical activity and public health,
 sport and exercise psychology, and sport
 pedagogy (master's degree only).

The MS degree can be completed via a
 thesis or project. The PhD degree requires
 the completion of a dissertation. For

further information about the graduate program in Exercise and Sport Science, visit the school's website at <http://health.oregonstate.edu/bphs>.

NUTRITION (MS, PhD, MAIS)

Graduate Areas of Concentration Nutrition

The School of Biological and Population Health Sciences offers graduate programs leading to the Master of Science (MS) and Doctor of Philosophy (PhD) degrees in nutrition. The program of study integrates multiple disciplines relevant to nutrition, including molecular, biochemical, physiological and clinical nutrition. The overall goal of the program is for the student to gain a "cutting-edge" understanding of contemporary issues in nutrition and apply these concepts to human health.

Research in nutrition is focused on human nutrition and nutrient effects on physiological systems impacting human health. Our research programs seek the discovery of new knowledge, information, techniques and/or interventions that can promote the optimal health of individuals and families in Oregon, nationally, and worldwide. A thesis based on original research is required for the MS and PhD degree programs.

Since nutrition builds upon the natural sciences, entering graduate students should have a strong background in chemistry, physiology, nutrition, statistics, and biochemistry.

Depending upon their concentration, graduates are prepared for positions in academic research and teaching or research and development in industry or government.

Information on the nutrition graduate program graduate fellowships and assistantships is available at the website: <http://health.oregonstate.edu/degrees/graduate/nutrition>, click on the "Application and Admission Requirements" link.

For additional information about the college and school, visit the website at <http://health.oregonstate.edu/about/>.

PUBLIC HEALTH (MPH, PhD)

Graduate Areas of Concentration *Biostatistics (MPH only); environmental and occupational health and safety (MPH, PhD); epidemiology (MPH only); health management and policy (MPH only); health policy (PhD only); health promotion and health behavior (MPH, PhD); international health (MPH only)*

The PhD and MPH in public health degree programs are summarized below.

For further information about public health graduate programs, contact 541-737-3825 or visit the Public Health major website at <http://health.oregonstate.edu/degrees/graduate/public-health>.

Doctor of Philosophy (PhD) in Public Health

The PhD in Public Health is for individuals who wish to prepare themselves for careers in university teaching, research, consulting, policy development, or other high-level public health positions. There are currently three areas of concentration offered for the PhD degree:

1. Environmental and occupational health and safety;
2. Health policy;
3. Health promotion and health behavior.

A master's degree in a relevant field is required before admission into the PhD program.

The PhD program consists of a minimum of 109 credits, including at least 36 graduate credits devoted to preparation of the thesis. Doctoral students take courses in research and quantitative methods, theory, ethics, and their area of emphasis. Each student and his or her doctoral committee jointly determine the student's specific program of doctoral study. This process allows students to design a course of study uniquely suited to their particular needs and career goals. Further information about these requirements is available in the PhD in Public Health website and PhD handbook at <http://health.oregonstate.edu/degrees/graduate/public-health/phd-program>.

Master of Public Health (MPH)

The Oregon Master of Public Health (OMPH) program is a joint graduate program offered by Oregon State University (OSU), Oregon Health and Sciences University (OHSU), and Portland State University (PSU). Oregon State University offers six tracks in the OMPH Program:

1. Biostatistics Track
2. Environmental and Occupational Health and Safety Track
3. Epidemiology Track
4. Health Management and Policy Track
5. Health Promotion and Health Behavior Track
6. International Health Track

All students in the OMPH must take a common MPH core of five courses in the following areas:

- Biostatistics
- Environmental health
- Epidemiology
- Health behavior
- Health systems organization

In addition, each OMPH track has specific course requirements. The OMPH tracks offered at OSU are summarized below. The minimum number of credits varies by track.

All MPH students must do a 6-credit internship upon completion of their core and track classes. Upon completion of all required course work and the internship, all MPH students must schedule a final oral examination. Students must receive

approval to take the exam from their academic advisors. For MPH students who choose to do a thesis or project, the oral exam will be included as part of the thesis/project defense.

Further information about the OMPH program and tracks can be found at the OMPH website at <http://www.oregonmph.org/> and MPH handbooks at <http://health.oregonstate.edu/degrees/graduate/public-health/graduate-handbooks>.

GRADUATE MINORS

EXERCISE AND SPORT SCIENCE GRADUATE MINOR

For more details, see the program advisor.

NUTRITION GRADUATE MINOR

For more details, see the school advisor.

PUBLIC HEALTH GRADUATE MINOR

For more details, see a public health program coordinator.

PUBLIC HEALTH GRADUATE CERTIFICATE

The graduate certificate in Public Health also is available via Ecampus.

MPH Core Courses (17 credits)

- H 512. Introduction to Environmental and Occupational Health Sciences (3)
- H 524. Introduction to Biostatistics (4)
- H 525. Principles of Epidemiology (4)
- H 533. Health Systems Organization (3)
- H 571. Principles of Health Behavior (3)

Electives (3 credits)

- H 530. Health Policy Analysis (3)
- H 536. Healthcare Organizational Theory and Behavior (3)

Total=20 credits

■ EXERCISE AND SPORT SCIENCE COURSES

EXSS 131. INTRODUCTION TO EXERCISE AND SPORT SCIENCE (1).

Overview of the field; career opportunities in exercise and sport science and other professions dealing with the discipline of human movement; orientation to support services. Graded P/N.

EXSS 132. INTRODUCTION TO THE ALLIED HEALTH PROFESSIONS (1).

Overview of allied health professions including physical and occupational therapy, physician assistant, nursing, athletic training and others. Discuss job responsibilities, employment opportunities and educational requirements.

EXSS 158. CARE AND PREVENTION OF ATHLETIC INJURIES (3).

Introduction to the athletic training profession. Lecture and laboratory experiences related to the prevention, assessment, treatment, and rehabilitation of sport-related injuries.

EXSS 159. DIRECTED OBSERVATION IN ATHLETIC TRAINING (1).

Directed observational experiences in the profession of athletic training under the supervision of certified athletic trainers. Gives students a laboratory setting in which to acquire the introductory skills of wound care, taping, range of motion assessment, and modality knowledge. **PREREQS:** EXSS 158

EXSS 194. PROFESSIONAL ACTIVITIES (1-2). Basic movement skills, basic rhythms, track and field.

EXSS 199. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 16 credits.

EXSS 230. INTRODUCTION TO ADVENTURE PROGRAMS (3). Foundation course for leadership opportunities in the Adventure Leadership Institute (ALI). Provides overview of history, theoretical foundations, and utilization of adventure programs in education, recreation, and therapy.

EXSS 231. GROUP DYNAMICS AND FACILITATION (3). Provides students with the fundamental concepts and theories essential for understanding dynamics that occur in groups in recreation, leisure, and everyday settings.

EXSS 259. ATHLETIC TRAINING PRACTICUM (2). Clinical experiences in athletic training under professional supervision with follow-up seminars. Lec/lab. **PREREQS:** EXSS 159 and admission into the Athletic Training major.

EXSS 265. EMERGENCY MANAGEMENT OF SPORTS TRAUMA (3). Knowledge and skills related to the specialized care required for serious and/or life-threatening sport-related injuries. **PREREQS:** EXSS 158 or equivalent

EXSS 299. SPECIAL TOPICS (1-3). This course is repeatable for a maximum of 24 credits.

EXSS 301. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

EXSS 305. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

EXSS 306. PROJECTS (1-16). This course is repeatable for a maximum of 36 credits. **PREREQS:** Departmental approval required.

EXSS 307. SEMINAR (1-3). Section 2: Seminar Pre-Internship (1 credit). This course is repeatable for a maximum of 3 credits.

EXSS 311. MOTOR BEHAVIOR (4). Underlying mechanisms and factors affecting movement function, skill acquisition, and changes in movement behavior across the lifespan. **PREREQS:** Z 332

EXSS 312. *SOCIOCULTURAL DIMENSIONS OF PHYSICAL ACTIVITY (3). Physical activity in contemporary society. Relationships with the social processes; interrelationships between physical activity and cultural institutions. (Bacc Core Course) **PREREQS:** Social processes course.

EXSS 313. LIFESPAN MOTOR DEVELOPMENT (4). Physical, neurological and physiological changes occurring throughout childhood and adolescence and their resultant effects upon motor skill learning and performance. Lec/lab. **PREREQS:** Junior standing.

EXSS 321. BIOMECHANICS OF HUMAN MOVEMENT (4). Integration of the physical laws and anatomical structures governing human movement; qualitative analytical processes emphasized. **PREREQS:** Z 331 and Z 341 and MTH 112

EXSS 322. ANATOMICAL KINESIOLOGY (4). Anatomical aspects of human movement; actions of bones and muscles in motor activities. Lec/lab. **PREREQS:** (Z 331 and Z 341)

EXSS 323. BIOMECHANICS OF SPORT AND EXERCISE (4). The physical laws and mechanical aspects governing human motor function; analytical processes emphasized. Lec/lab. **PREREQS:** (Z 331 and Z 341 and PH 201)

EXSS 324. EXERCISE PHYSIOLOGY (4). Physiological effects of acute and chronic exercise; factors affecting human performance; exercise training principles. **PREREQS:** Z 333 and

CH 121 and CH 122 and (CH 123 or CH 130) and Z 331 or equivalent

EXSS 325. FITNESS ASSESSMENT AND EXERCISE PRESCRIPTION (2). Introduction to lab- and field-based physical fitness assessments and the skills needed to design safe and effective exercise programs for apparently healthy adults. Lec/lab. **PREREQS:** EXSS 324

EXSS 333. EXERCISE AND SPORT SCIENCE PRACTICUM (2). Field experience under professional supervision. This course is repeatable for a maximum of 4 credits. **PREREQS:** Departmental approval required.

EXSS 334. EXERCISE AND SPORT SCIENCE PRACTICUM (2). Field experience under professional supervision. This course is repeatable for a maximum of 4 credits. **PREREQS:** Instructor approval.

EXSS 335. EXERCISE AND SPORT SCIENCE PRACTICUM (2). Field experience under professional supervision. This course is repeatable for a maximum of 4 credits. **PREREQS:** Instructor approval.

EXSS 340. ORGANIZATION OF SPORT PROGRAMS (3). Organizational theory of youth and adult sport programs in a variety of environments; includes competition schemes; requires application of theory to a specific activity experience. **PREREQS:** Sophomore standing.

EXSS 343. PRE-THERAPY/ALLIED HEALTH SEMINAR (1). Provides knowledge in professional school preparation and current issues related to the allied health professions. **PREREQS:** Overall GPA of 3.0; grade of C or better in EXSS 132; Grade of C or better and average of 2.7 in Z 331, Z 332, Z 333, Z 341, Z 342, Z 343. Instructor/school approval.

EXSS 344. PRE-THERAPY/ALLIED HEALTH PRACTICUM (2). Clinical field experiences under the supervision of a licensed professional in the allied health or related setting enhanced with classroom discussion. **PREREQS:** Overall GPA of 3.0; grade of "C" or better in EXSS 132; grade of "C" or better and average of 2.7 in Z 331, Z 332, Z 333, Z 341, Z 342, Z 343. Instructor/school approval. **COREQS:** EXSS 343

EXSS 345. ALLIED HEALTH PRACTICUM (2). Field experience under professional supervision in an allied health or related setting. Includes arranged consultations with the instructor to discuss current issues related to the allied health professions. **PREREQS:** overall GPA 2.75. Departmental approval required.

EXSS 350. ORTHOPEDIC ASSESSMENT OF UPPER EXTREMITY INJURIES (4). Mastery of educational competencies and clinical proficiencies associated with medical history taking, evaluation, diagnosis and treatment of sports-related upper extremity and cervical spine injuries and conditions. Lec/lab. **PREREQS:** (EXSS 158 and Z 331 and Z 341) and instructor approval if not admitted to the Athletic Training major.

EXSS 351. ORTHOPEDIC ASSESSMENT OF LOWER EXTREMITY INJURIES (4). Mastery of educational competencies and clinical proficiencies associated with medical history taking, evaluation, diagnosis and treatment of sports-related lower extremity and lumbar spine injuries and conditions. Lec/lab. **PREREQS:** EXSS 350

EXSS 353. PHYSICAL EDUCATION TEACHER EDUCATION PRACTICUM (2). Supervised K-12 physical education field experience with seminars. May include one instructor-approved coaching experience in school setting. **PREREQS:** OSU GPA 2.00, EXSS GPA 2.50, PETE GPA 2.25, and departmental approval required.

EXSS 354. PHYSICAL EDUCATION TEACHER EDUCATION PRACTICUM (2). Supervised K-12 physical education field experience with seminars. May include one instructor-approved coaching experience in school setting. **PREREQS:** OSU

GPA 2.00, EXSS GPA 2.50, PETE GPA 2.25, EXSS 353 and departmental approval required. Should also concurrently enroll in either EXSS 360 or EXSS 420.

EXSS 355. PHYSICAL EDUCATION TEACHER EDUCATION PRACTICUM (2). Supervised K-12 physical education field experience with seminars. May include one instructor-approved coaching experience in school setting. **PREREQS:** OSU GPA 2.00, EXSS GPA 2.50, PETE GPA 2.25, EXSS 354. Departmental approval required. Should also concurrently enroll in either EXSS 360 or EXSS 420.

EXSS 358. ATHLETIC TRAINING PRACTICUM (2). Clinical experiences in athletic training under professional supervision with follow-up seminars. Lec/lab. **PREREQS:** (EXSS 350 and EXSS 351) and admission into the Athletic Training major.

EXSS 359. ATHLETIC TRAINING PRACTICUM (2). Clinical experiences in athletic training under professional supervision with follow-up seminars. Lec/lab. **PREREQS:** (EXSS 350 and EXSS 351) and admission to the Athletic Training major.

EXSS 360. SPORT SKILL ANALYSIS I (2). Introduction to a variety of sports skills; opportunities for sports skill analysis. Focus is on identifying and assessing the critical elements of skills.

EXSS 361. SPORT SKILL ANALYSIS II (2). Introduction to a variety of sport skills; opportunities for sport skill analysis. Focus is the "Teaching Games for Understanding" (TGUFU) approach to teaching movement skills.

EXSS 362. SPORT SKILL ANALYSIS III (2). Introduction to a variety of sport skills; opportunities for sport skill analysis. Focus is the Sport Education approach that emphasizes learning through sport.

EXSS 365. EMERGENCY MANAGEMENT OF SPORTS TRAUMA (3). Knowledge and skills related to the specialized care required for serious and/or life-threatening sport-related injuries. **PREREQS:** EXSS 351 and admission to the Athletic Training major.

EXSS 370. PSYCHOLOGY OF SPORT AND PHYSICAL ACTIVITY (3). Interaction between psychological variables and human motor performance.

EXSS 371. MEASUREMENT AND DATA ANALYSIS IN EXERCISE SCIENCE (4). Elementary statistical methods and evaluation techniques applied to Exercise and Sport Sciences. Lec/lab. **PREREQS:** (MTH 111 or MTH 112)

EXSS 380. THERAPEUTIC MODALITIES (4). Indications, contraindication, techniques, and effects of various physical agents used in the care and treatment of musculoskeletal injuries and diseases. **PREREQS:** Admission to the Athletic Training option or enrollment in a pre-therapy program in the Department of Nutrition and Exercise Sciences or College of Science.

EXSS 381. ^ANALYSIS OF CRITICAL ISSUES IN EXERCISE AND SPORT SCIENCE (3). Review current literature, professional issues, and societal interrelationships in EXSS. The course emphasizes writing as a tool for learning and the products of writing. (Writing Intensive Course) **PREREQS:** Junior standing.

EXSS 385. THERAPEUTIC EXERCISE (4). Principles and techniques of therapeutic exercise; rehabilitative activities and programs for musculoskeletal injuries, conditions, and diseases. Lec/lab. **PREREQS:** EXSS 322 and .

EXSS 394. PROFESSIONAL ACTIVITIES: RESISTANCE TRAINING PROGRAM DESIGN (2). Presents the conceptual basis for optimizing resistance training program designs, exercise routines for all ages and fitness levels, correct exercise technique. Lec/lab. **PREREQS:** EXSS 324

EXSS 395. PROFESSIONAL ACTIVITIES: GROUP FITNESS (2). Application of

biomechanical, physiological, psychological and safety principles for the development of group exercise classes in a variety of modes and settings. Lec/lab. **PREREQS:** (EXSS 324 and EXSS 325*)

EXSS 396. PROFESSIONAL ACTIVITIES: AQUATICS (2). Aquatic overview; emphasis on underlying hydrodynamic principles; includes safety, survival, stroke mechanics, aquatic exercise, training, games; certification opportunity in ARC Basic Water Rescue. Lec/lab/activity. **PREREQS:** PAC 250 or comparable skills.

EXSS 399. SPECIAL TOPICS (1-3). This course is repeatable for a maximum of 18 credits.

EXSS 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

EXSS 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits.

EXSS 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

EXSS 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

EXSS 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

EXSS 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

EXSS 410. INTERNSHIP (3-15). Planned experiences at selected cooperating agencies, companies or institutions; supervised by university and program personnel; supplementary conference, reports and appraisal required. This course is repeatable for a maximum of 16 credits. **PREREQS:** Completion of required courses, cumulative EXSS program GPA of 2.25 and EXSS overall GPA of 2.50, completion of 165 credits or departmental approval.

EXSS 411. MOVEMENT SKILL LEARNING AND CONTROL (3). Motor control and learning, including neural and mechanical mechanisms underlying motor behavior and application of theoretical concepts to instructional and clinical settings. **PREREQS:** EXSS 322

EXSS 414. PHYSICAL ACTIVITY AND AGING (3). Examination of structural, physiological, psychological, and functional changes occurring during late adulthood and implications for the planning, implementation, and evaluation of physical activity programs for the older adult population.

EXSS 420. PHYSICAL ACTIVITY FOR CHILDREN (3). Elementary school physical education practices with an emphasis on effective instructional strategies and developmentally appropriate activities for children ages 5-12.

EXSS 421. PHYSICAL ACTIVITY FOR ADOLESCENTS (3). Introduction for prospective teachers in physical education in recent trends and developments in delivery of physical education programs at secondary school levels.

EXSS 434. APPLIED MUSCLE PHYSIOLOGY (3). Skeletal muscle structure, function, and metabolism; applications to muscle fatigue, exercise training, inactivity, and aging. **PREREQS:** EXSS 324

EXSS 435. PHYSICAL ACTIVITY PROMOTION (3). Application of behavioral science and public health research to the promotion of physical activity in individuals, groups and communities. **PREREQS:** EXSS 370

EXSS 436. EXERCISE MANAGEMENT OF CHRONIC DISEASE (3). Use of exercise to manage chronic disease and limit disease progression, including disease effects on exercise capacity and adaptation to training. Design

and implementation of appropriate exercise prescriptions at the population and individual level. **PREREQS:** EXSS 325

EXSS 444. ADAPTED PHYSICAL ACTIVITY (4). Overview of cognitive, neuromuscular, sensory and orthopedic impairments; design and implementation of physical activity programs for individuals with disabilities. Lec/lab. **PREREQS:** EXSS 411 and EXSS 324

EXSS 452. ATHLETIC TRAINING PROGRAM MANAGEMENT (3). Administrative aspects of athletic training program management, including medical-legal issues, personnel, budgetary, record keeping, supply requisition and inventory, and current professional issues. **PREREQS:** Admission to the Athletic Training major.

EXSS 455. *PHARMACOLOGY IN ATHLETIC TRAINING (3). Pharmacology in sports medicine, topics including, but not limited to, the mechanisms and actions of drugs commonly administered and prescribed in sports medicine environments. (Writing Intensive Course) **PREREQS:** EXSS 359 and admission to the Athletic Training Practicum.

EXSS 474. EXERCISE PHYSIOLOGY LAB METHODS (2). Practical experience and projects in exercise physiology lab methods, including measurement of submaximal and maximal oxygen consumption body composition, anaerobic power, and electrocardiography. This course is repeatable for a maximum of 3 credits. **PREREQS:** (EXSS 324 and EXSS 325)

EXSS 475. *POWER AND PRIVILEGE IN SPORT (3). Issues of power and privilege in sport including race, gender, sexual orientation, disability and aggression and the consequences of long held societal norms and stereotypes. (Bacc Core Course) **PREREQS:** EXSS 312 or 6 credits of social science.

EXSS 499. SELECTED TOPICS (1-3). Impact of human movement development on people, their movement behavior, and environment. Topics vary from term to term and year to year. May be repeated for credit when topics differ. This course is repeatable for a maximum of 24 credits. **PREREQS:** Senior standing.

EXSS 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

EXSS 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Instructor's approval required.

EXSS 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

EXSS 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

EXSS 507. SEMINAR (1-16). Section 1: Seminar. Graduate research seminar that emphasizes student oral presentations of current research topics in exercise and sport science. One credit required for all graduate students. Section 2: Current Developments (1). Discussion of contemporary issues in the exercise and sport literature. Topics vary by term. Two credits required of all doctoral students. Section 9: International Aspects (1). Discussion of international aspects of study in exercise and sport science. Required of all doctoral students. Graded P/N. This course is repeatable for a maximum of 16 credits.

EXSS 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

EXSS 510. PROFESSIONAL INTERNSHIP: PHYSICAL EDUCATION (1-15). Field experience in which the intern will integrate academic study with classroom teaching experience to learn specific competencies relating to functioning well in the context of the classroom and the school,

and demonstrate this competency through the assessment of work by supervisors and by evidence collected and presented in work samples. This course is repeatable for a maximum of 25 credits.

EXSS 512. APPLIED MOTOR LEARNING (3). Application of research and theory to the teaching of motor skills with emphasis on development of instructional strategies related to modeling, knowledge of results, practice, and motivational aspects of learning. **PREREQS:** EXSS 411

EXSS 515. MOTOR CONTROL AND MOVEMENT DYSFUNCTION (3). Contemporary motor control theories and their application to the development of instructional and training programs for individuals with movement disorders caused by neurological disease and/or trauma. **PREREQS:** EXSS 411 and (EXSS 444 or EXSS 544)

EXSS 523. BIOMECHANICS OF MOTOR ACTIVITIES (3). Kinematic and kinetic analysis of volitional human movement with emphasis on analytical techniques and quantitative problem solving. **PREREQS:** EXSS 323 or PH 201

EXSS 525. BIOMECHANICS OF MUSCULOSKELETAL INJURY (3). Mechanical causes and effects of forces applied to the musculoskeletal system, material properties of human tissues, pathomechanics of injury, and degenerative changes across the lifespan. Not offered every year.

EXSS 531. ORTHOPEDIC SPORTS MEDICINE: LUMBAR SPINE INJURIES (3). Lecture and discussion of lumbar spine functional anatomy, biomechanics of movement and assessment of sports-related musculoskeletal injuries and conditions.

EXSS 533. ENERGETICS AND BIOCHEMISTRY OF EXERCISE (3). Metabolic and energetic responses to acute and chronic physical activity; emphasis on recent research. **PREREQS:** Undergraduate course in biochemistry or exercise physiology.

EXSS 534. MUSCLE PHYSIOLOGY AND PLASTICITY (3). Physiological, metabolic, and molecular aspects of muscle contraction; muscle plasticity in response to mechanical loading, exercise, aging, injury, and disease. **PREREQS:** EXSS 324

EXSS 536. EXERCISE MANAGEMENT OF CHRONIC DISEASE (3). Use of exercise to manage chronic disease and limit disease progression, including disease effects on exercise capacity and adaptation to training. Design and implementation of appropriate exercise prescriptions at the population and individual level. **PREREQS:** EXSS 325

EXSS 544. ADAPTED PHYSICAL ACTIVITY (4). Overview of cognitive, neuromuscular, sensory and orthopedic impairments; design and implementation of physical activity programs for individuals with disabilities. **PREREQS:** EXSS 411 and EXSS 324

EXSS 547. INCLUSION IN PHYSICAL ACTIVITY (3). Effectiveness of physical activity programs provided in inclusive settings. This will include a lifespan/noncategorical approach to program development. **PREREQS:** EXSS 444 or equivalent

EXSS 548. ASSESSMENT AND PROGRAMMING FOR SPECIAL POPULATIONS (3). Use of appropriate assessment procedures for developing effective psychomotor programs for the disabled. **PREREQS:** EXSS 444 and EXSS 471

EXSS 549. PHYSICAL ACTIVITY FOR PERSONS WITH SEVERE DISABILITIES (3). Plan, develop and implement appropriate physical activity programs, functional program design, assistive technology, instructional strategies, behavior management practices, and data analysis systems that address the needs for psychomotor performance of persons with low incidence disabilities. **PREREQS:** EXSS 444 or EXSS 544

EXSS 550. HEALTH PROMOTION FOR PEOPLE WITH DISABILITIES (3). Discussion will focus on disability and health, theory driving health promotion program development, guidelines for developing a program for individuals with disabilities, and program evaluation.

EXSS 551. CURRENT TRENDS AND ISSUES IN PHYSICAL EDUCATION (4). Current trends and issues in physical education, including curriculum development, professional ethics, instructional practices, and physical activity for the school community. **PREREQS:** Admission to the MS-PETE Program.

EXSS 552. ANALYSIS OF MOVEMENT SKILLS (3). Isolating and analyzing movement tasks; organizing tasks into teachable components; arranging sequences into logical progressions for students; using information feedback to refine skills; extending, refining, and applying movement tasks. **PREREQS:** Admission to the MS-PETE Program.

EXSS 553. INSTRUCTIONAL ANALYSIS TECHNIQUES I (3). Introduction to techniques of instructional analysis. Provides in-depth information and training in systematic observation techniques, raw data conversion and inter/intraobserver reliability. **PREREQS:** Admission to the MS-PETE Program.

EXSS 554. INSTRUCTIONAL ANALYSIS TECHNIQUES II (3). Laboratory/seminar experience to accompany student teaching winter and spring terms. Provides continued application of systematic observation techniques throughout the elementary student teaching experience. **PREREQS:** Admission to the MS-PETE Program.

EXSS 555. SKILL ANALYSIS AND ASSESSMENT IN K-12 (3). Develop proficiency in assessing movement skills, execution of sport techniques, and game play performance. Assessment trends and practices utilized in physical education programs is included. **PREREQS:** Admission to MS-PETE Program.

EXSS 556. INSTRUCTIONAL SKILLS I (3). Skills of planning, implementing, and evaluating programs of instruction in physical education, grades K-12. **PREREQS:** Admission to the MS-PETE Program.

EXSS 557. INSTRUCTIONAL SKILLS II (2). Applying and refining skills of planning, implementing and evaluating programs of instruction in physical education, grades K-12. **PREREQS:** Admission to the MS-PETE Program.

EXSS 558. PHYSICAL EDUCATION CURRICULUM DESIGN AND ORGANIZATION (3). Curricular programs and variations from kindergarten through grade 12, administrative policies and practices. **PREREQS:** Admission to the MS-PETE Program.

EXSS 559. THE PHYSICAL EDUCATOR AS A PROFESSIONAL (1). Transitioning to teaching, developing a portfolio, certification, obtaining a position, teacher burnout, professionalism, problems of first-year teachers, developing patterns of behavior that lead to a successful career. **PREREQS:** Admission to the MS-PETE Program.

EXSS 560. MOTIVATION IN PHYSICAL ACTIVITY (3). A social psychological approach to understanding the role of self-perceptions and cognitions in explaining motivated behavior in the sport and exercise settings. **PREREQS:** EXSS 370

EXSS 561. PSYCHOSOCIAL FACTORS IN PHYSICAL ACTIVITY (3). A social psychological approach to understanding the role of social interactions and contextual factors in explaining human behavior in the sport and exercise settings. **PREREQS:** EXSS 560

EXSS 562. LIFESPAN SPORT AND EXERCISE PSYCHOLOGY (3). Social-psychological issues across the lifespan in the context of sport and exercise. **PREREQS:** EXSS 561

EXSS 573. MEASUREMENT IN HUMAN MOVEMENT (3). Measurement theory applied to the study of human movement. Principles and methods for assessing validity and reliability of norm-referenced and criterion-referenced tests in the motor domain. **PREREQS:** EXSS 471 and ST 511

EXSS 575. RESEARCH IN HUMAN MOVEMENT (3). Investigation and evaluation of research methods applicable to human movement study and professional physical education. **PREREQS:** EXSS 471 and ST 511

EXSS 599. SPECIAL TOPICS (1-3). Impact of human movement development on people, their movement behavior, and environment. Topics vary from term to term and year to year. May be repeated for credit when topics differ. This course is repeatable for a maximum of 99 credits. **PREREQS:** Graduate standing.

EXSS 601. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

EXSS 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Instructor's approval required.

EXSS 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

EXSS 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

EXSS 607. SEMINAR (1-16). Section 1: Graduate Research (1); Seminar emphasizes student oral presentations of current research topics in exercise and sport science. One credit required of all graduate students. Section 3: Current Developments (1); Discussion of contemporary issues in the exercise and sport science literature. Topics vary by term. Two credits required of all doctoral students. Section 9: International Aspects (1); Discussion of international aspects of study in exercise and sport science. Required of all doctoral students. Graded P/N. This course is repeatable for a maximum of 16 credits.

EXSS 699. SPECIAL TOPICS (1-16). Current issues, trends, and topics in EXSS research. May be repeated for credit with different topics. This course is repeatable for a maximum of 25 credits.

EXSS 808. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

■ PUBLIC HEALTH COURSES

H 100. INTRODUCTION TO PUBLIC HEALTH (4). A basic overview of public health. Uses a mix of lectures, guest speakers, classroom activities and homework to help students understand the role of public health in eliminating health disparities, understanding epidemics, and setting policy.

H 120. *HEALTH AND CULTURE: USING THEATRE TO PROMOTE HEALTH (3). A fun and interactive way to promote safer sex and communication with your partner, cultural awareness, healthy body image, responsible drinking, and other health issues. Course work focuses on the major health and social issues facing college students, health disparities, cultural differences in health beliefs and behaviors, acting techniques and performance preparation skills. (Bacc Core Course)

H 199. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 16 credits.

H 210. *INTRODUCTION TO THE HEALTH CARE SYSTEM (3). Provides tools to understand and critically assess the health care delivery system, its components, and the challenges created by its structure. The health care system will be considered from the perspective of several main players [e.g., patients, hospitals, doctors, health plans]. (Bacc Core Course)

H 220. INTRODUCTION TO HEALTH DATA ANALYSIS (3). Introduction to the application of biostatistics and probability to the health sciences. Topics include quantitative analysis and inference, statistical methods in the biosciences, and quantitative study to evaluate and control health problems. **PREREQS:** MTH 105 or MTH 111 or higher mathematics.

H 225. *SOCIAL AND INDIVIDUAL HEALTH DETERMINANTS (4). Overview of the macro (social/system/environmental) and micro (individual) contributors to premature disease, disability and population health. Selected behavioral theories supporting health risks and strategies for the prevention of premature disease/disability and the promotion of health. (Bacc Core Course)

H 250. INTRODUCTION TO HEALTH CARE MANAGEMENT (3). Participants will learn key principles, practices and personalities of health care management. The content is broadly applicable to health care enterprises of every kind: public health organizations, physician practices and clinics, hospitals and health systems, agencies and service organizations, for-profit firms, not-for-profit enterprises, etc. **PREREQS:** H 210*

H 309. PRACTICUM IN HEALTH CARE SERVICES (3-6). Supervised work experience in a health care service setting or health-related agency or program. Weekly progress reports and post-experience summary report and evaluation will be expected. Preplanned with instructor approval. Open to health care administration majors. Graded P/N. This course is repeatable for a maximum of 12 credits. **PREREQS:** Junior standing. Instructor consent required.

H 310. HEALTH FIELD EXPERIENCES (3-6). Introductory field experience in a health or health-related worksite. Graded P/N. This course is repeatable for a maximum of 12 credits. **PREREQS:** H 225 and H 210 and H 220 and junior standing.

H 312. *AIDS AND SEXUALLY TRANSMITTED DISEASES IN MODERN SOCIETY (3). Fundamental principles relating to etiology, nature, prevention, and control of AIDS and other sexually transmitted diseases in contemporary society; emphasis on social, psychological, legal, economic, and ethical issues surrounding these diseases. (Bacc Core Course)

H 319. INTRODUCTION TO HEALTH POLICY (3). Describe the policy development process, including problem conceptualization, agenda setting, role of interest groups and public opinion, analysis of alternatives and selection of policy alternative. **PREREQS:** H 210

H 320. INTRODUCTION TO HUMAN DISEASE (3). Fundamental principles relating to etiology, nature, prevention, and control of communicable and noncommunicable diseases in human populations. Special emphasis on disease prevention and health promotion in the high risk diseases of modern, industrialized society.

H 344. FOUNDATIONS OF ENVIRONMENTAL HEALTH (3). Introductory course examining environmentally-linked disease, and health effects associated with toxic substances, food quality, pesticides, air, water, and noise pollution, and solid/hazardous wastes.

H 349. PEER HELPER SKILLS DEVELOPMENT (3). Prepares the student for an active role as a peer helper in alcohol and drug abuse prevention and health education. Course work will include: drug, alcohol, addiction and other related health issues, basic listening and communication skills, conflict resolution, crisis recognition and referral. A major component will be affective learning situations designed to promote self-awareness and personal growth.

H 364. DRUGS, SOCIETY AND HUMAN BEHAVIOR (3). Drug use and abuse; theories of addiction; basic principles of drug action regarding

the use of sedative and stimulative compounds; alcohol; opiates; hallucinogens; designer drugs; cocaine; and over-the-counter products. Particular emphasis on the role of the individual's value orientation, decision-making, and self-responsibility in treatment and educational approaches to prevention. **PREREQS:** (PSY 201 or PSY 202)

H 364H. DRUGS, SOCIETY AND HUMAN BEHAVIOR (3). Drug use and abuse; theories of addiction; basic principles of drug action regarding the use of sedative and stimulative compounds; alcohol; opiates; hallucinogens; designer drugs; cocaine; and over-the-counter products. Particular emphasis on the role of the individual's value orientation. **PREREQS:** (PSY 201 or PSY 202) and Honors College approval required.

H 385. SAFETY AND HEALTH STANDARDS AND LAWS (3). Emphasis on the Occupational Safety and Health Act; study includes the scope and duties under the act, enforcement, and adjudication procedures and OSHA litigation; components of Oregon-OSHA.

H 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

H 399H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

H 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor's consent required.

H 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits.

H 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor's consent required.

H 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor's consent required.

H 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor's consent required.

H 407. SEMINAR (2). Seminar to prepare students for their internship in public health. This course is repeatable for a maximum of 6 credits. **PREREQS:** HMP (Health Management Promotion) option students are required to take H 436 in preparation and hold junior standing. HPHB (Health Promotion and Health Behavior) option students are required to take H 225 and H 320 and hold junior standing.

H 407H. SEMINAR (2). Seminar to prepare students for their internship in public health. This course is repeatable for a maximum of 6 credits. **PREREQS:** HMP (Health Management Promotion) option students are required to take H 436 in preparation and hold junior standing. HPHB (Health Promotion and Health Behavior) option students are required to take H 225 and H 320 and hold junior standing. Honors College approval required.

H 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor consent required.

H 409. PRACTICUM (1-6). Supervised work experience in a public health or health care administration setting. Open to majors in public health. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Senior standing and departmental approval.

H 410. INTERNSHIP (1-12). Directed field experience with participation in a community, worksite, or health agency program. Experience is individually arranged to meet student needs. Graded P/N. This course is repeatable for a maximum of 24 credits. **PREREQS:** For Health Promotion and Health Behavior students only: H 225, H 320, H 407, H 449 and H 476; junior standing and instructor approval.

H 418. PUBLIC HEALTH ETHICS AND ISSUES (3). Current ethical issues in public health, including gender and ethnicity in employment, pharmaceutical controls, product liability, advertising, and export of high technology. **PREREQS:** Senior standing.

H 421. MENTAL HEALTH (3). Examination of social, governmental, legal and individual mental health issues. Brief overview of some major mental disorders. **PREREQS:** (H 225 and H 320) and junior standing.

H 422. HEALTH, AGING AND CONTROL OF CHRONIC DISEASES (4). Epidemiology of the major chronic diseases, risk factors, potential methods of prevention/intervention, ethical issues, and efficacy of current methods of prevention and control. Emphasis on adult populations and public health services, policies, and programs at the local, state, and federal levels designed to promote healthy aging. **PREREQS:** 9 credits of health course work.

H 425. FOUNDATIONS OF EPIDEMIOLOGY (3). Measures of disease frequency; measures of effect; association and causation; sources of inaccuracy; experimental and observational study designs. **PREREQS:** (H 220 or ST 201) and junior standing.

H 429. INTERNATIONAL HEALTH (3). Overview of the epidemiological, economic, political, sociological, and cultural factors that impact on international health. Special emphasis on the methods of prevention/intervention utilized in coping with health problems on an international level. **PREREQS:** Senior standing.

H 431. HEALTH CARE MARKETING (3). Principles, elements and methods of marketing health care services. Role of the consumer, governing body, administration and medical staff as well as impact of professional ethics.

H 432. ECONOMIC ISSUES IN HEALTH AND MEDICAL CARE (3). Application of economic principles to the health care field: the demand for medical care and insurance, health care suppliers, health care markets. **PREREQS:** ((ECON 201 or ECON 201H) and H 210 and H 457) and junior standing.

H 434. HEALTH CARE LAW AND REGULATION (3). Legal aspects of health care delivery; tort law and its applications; professional liability and liability insurance; laws relative to health care institutions, cost controls, antitrust and access. (Writing Intensive Course) **PREREQS:** (H 210 and H 250) and Admission to HMP program and junior standing.

H 436. ADVANCED TOPICS IN HEALTH CARE MANAGEMENT (3). Covers how health services are governed and organized; how health care organizations assess and adapt to change; constraints/opportunities in shaping organizational performance; leadership; strategic decision-making and the use of evidence-based management in health care. **PREREQS:** (H 210 and H 250) and junior standing.

H 445. OCCUPATIONAL HEALTH (3). Current and historical topics in the area of occupational health, with particular emphasis on the types of materials that produce human health effects; clinical and epidemiologic data used to assess the public health importance of occupational pollutants and to evaluate control strategies. (Bacc Core Course)

H 448. ENVIRONMENTAL & OCCUPATIONAL TOXICOLOGY & RISK ASSESSMENT (3). Introduction to the basic principles of toxicology and risk assessment as they apply to environmental and occupational health. **PREREQS:** One year basic college chemistry and biology and two terms organic chemistry.

H 449. MASS MEDIA AND HEALTH (3). Designed to examine the effects of mass media on population health, from the negative impact of advertising of cigarettes, alcohol and junk food,

to the (hopefully) positive impact of public-health campaigns. **PREREQS:** (H 225 and H 320) and junior standing.

H 456. STRATEGIC MANAGEMENT OF HEALTH SERVICE ORGANIZATIONS (3). Theories and methodologies of long-range planning and strategic management in health care organizations. **PREREQS:** Admission to HMP program.

H 457. FINANCIAL MANAGEMENT OF HEALTH CARE ORGANIZATIONS (3). Utilization of standard financial tools needed to manage the capital resources of health care organizations. Includes funding capital projects, product costing, budgeting methods, capital formation and investment strategies. **PREREQS:** (H 210 and H 250)

H 458. REIMBURSEMENT MECHANISMS (3). Introduces and analyzes the different types of healthcare reimbursement methodologies used in the U.S. health care system. **PREREQS:** H 210 and junior standing.

H 461. SEXUALITY: A HEALTH SCIENCE PERSPECTIVE (3). Exploration of the meaning of sexuality from a variety of contemporary health science perspectives; aspects of sex and sexuality fundamental to total health; issues central to the health educator role examined. **PREREQS:** Senior standing.

H 465. PUBLIC HEALTH AND WOMEN: SOCIAL AND POLICY ISSUES (3). Public health approach to the identification of women's health needs in the United States and in other countries as it relates to the intersection of race, ethnicity, social class, sexual orientation, age, and ability. (Bacc Core Course) **PREREQS:** 6 credits in public health.

H 467. LONG-TERM CARE ALTERNATIVES (3). Overview of the long-term care alternatives. Comparisons of nursing homes with community based facilities; adult day care centers, respite to hospice facilities, social HMOs and other services; cost, quality of life and practicality are addressed.

H 468. FINANCING AND ADMINISTRATION OF LONG-TERM CARE (3). Examines the financing and administration of long term care. Emphasis is on a system-wide overview and specific application to nursing facility management. **PREREQS:** Admission to HMP program.

H 474. PUBLIC HEALTH AND VIOLENCE IN SOCIETY (3). Examination of violence as a major public health issue. Historical, social, environmental, economic, behavioral and psychological aspects of assaultive violence, spousal abuse, rape and sexual assault, child abuse, child sexual abuse, suicide, the effects of the media on violence, drug abuse and violence, and related public health problems in contemporary American society. Emphasis on health and the efficacy of current efforts aimed at ameliorating these problems and potential for alternative public health models for prevention and intervention.

H 476. PLANNING AND EVALUATING HEALTH PROMOTION PROGRAMS (4). A systematic approach to planning, implementing and evaluating health promotion programs in a variety of health related settings. Students will be writing a series of drafts to effectively develop a health promotion program plan. (Writing Intensive Course) **PREREQS:** (H 225 and H 320) and at least junior standing.

H 477. DIETARY INTERVENTIONS FOR PUBLIC HEALTH (3). A public health perspective on the practice of population-based dietary intervention. Examination of relevant theories, research, and practice that pertain to health promoters/educators. CROSSLISTED as NUTR 477/NUTR 577. **PREREQS:** NUTR 225

H 489. EMERGENCY AND DISASTER MANAGEMENT (3). Study of preparedness, response, recovery and business resumption

strategies, activities and applications needed to effectively deal with emergency and disaster incidents.

H 491. SELECTED TOPICS (1-3). Recent changes and advances in public health and health care administration and their application to special fields of study. Topics vary from term to term and year to year. This course is repeatable for a maximum of 6 credits. **PREREQS:** Senior standing.

H 491H. SPECIAL TOPICS (1-3). Recent changes and advances in public health and health care administration and their application to special fields of study. Topics vary from term to term and year to year. This course is repeatable for a maximum of 6 credits. **PREREQS:** Senior standing and Honors College approval required.

H 494. APPLIED ERGONOMICS (3). Principles of occupational ergonomics for managing optimal worker performance and well-being.

H 495. DESIGN FOR ENVIRONMENT, SAFETY, AND HEALTH (3). Systematic consideration of environmental, safety, and health concerns at the earliest possible stage in the lifecycle design engineering of products, technologies, and manufacturing processes. **PREREQS:** Junior or senior standing.

H 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Instructor approval required.

H 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 507. SEMINAR (1-16). Section 1. Internship (1). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 509. PRACTICUM (1-16). Supervised work experience in a public health or health care administration setting. Open to majors in public health. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Senior standing and departmental approval.

H 510. INTERNSHIP (1-16). Directed field experience with participation in a community, worksite, or health agency program. Experience is individually arranged to meet student needs. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Graduate standing in Public Health Department, instructor approval required, departmental approval required.

H 512. INTRODUCTION TO ENVIRONMENTAL & OCCUPATIONAL HEALTH SCIENCES (3). Introduction to environmental and occupational health. Hazards affecting human health are examined in the context of current social, political and regulatory pressures.

H 514. ENVIRONMENT, SAFETY AND HEALTH SEMINAR (1). One-credit graduate seminar on current topics of interest and importance to the environmental health and occupational safety field. Critical reading of research publications, discussion of controversial issues facing ESH professionals, and/or presentation of current ESH research. This course is repeatable for a maximum of 3 credits.

H 515. RESEARCH METHODS IN SOCIAL AND BEHAVIORAL HEALTH SCIENCES (3). Provides an introduction to quantitative research methods

and design. Topics include definition of research problems and questions, hypothesis generation, research design, sampling, variable definition and measurement, data collection, and ethical considerations. Also provides a brief introduction to qualitative and mixed methods.

H 518. PUBLIC HEALTH ETHICS AND ISSUES (3). Current ethical issues in public health, including gender and ethnicity in employment, pharmaceutical controls, product liability, advertising, and export of high technology. **PREREQS:** Graduate standing.

H 520. HEALTH DISPARITIES (3). Health disparities based on race/ethnicity, culture, social class, and rural/urban residence, among others; strategies to reduce disparities, promote health, and prevent disease in diverse populations.

H 521. MENTAL HEALTH (3). Focus upon mental health policy development, in relation to federal and state government services and regulations, implementation of services.

H 522. HEALTH, AGING AND CONTROL OF CHRONIC DISEASES (4). Epidemiology of the major chronic diseases, risk factors, potential methods of prevention/intervention, ethical issues, and efficacy of current methods of prevention and control. Emphasis on adult populations and public health services, policies, and programs at the local, state, and federal levels designed to promote healthy aging. **PREREQS:** 9 credits of public health course work.

H 523. FOUNDATIONS OF PUBLIC HEALTH (4). Fundamental principles, concepts and tools used in public health to promote the health of populations. Using a combination of case study method, lecture and discussion, students will develop a broad understanding of public health and recognition of how discipline-specializations address the social, behavioral and environmental determinants of public health. **PREREQS:** Graduate standing.

H 524. INTRODUCTION TO BIOSTATISTICS (4). Quantitative analysis and interpretation of health data including probability distributions, estimation of effects, and hypothesis-tests such as Chi-square, one-way ANOVA, and simple linear regression.

H 525. PRINCIPLES OF EPIDEMIOLOGY (4). Introduction to the concepts and methods of epidemiology. Topics include measures of population health, screening, study design, measures of association, and interpretation of epidemiological data.

H 526. EPIDEMIOLOGIC METHODS (3). Principles and methods of epidemiologic analysis; standardization; stratified analysis; confounding and its control; planning and conducting epidemiologic research; role of multivariate analysis in epidemiologic research. **PREREQS:** H 525

H 527. CASE STUDIES IN INTERNATIONAL HEALTH (3). International, public health challenges using case studies from different countries. Includes tropical disease and injury epidemiology in a variety of social, political, and economic contexts. **PREREQS:** Graduate standing.

H 528. GLOBAL HEALTH ISSUES (3). Examines major issues in health developments of global significance, their causes and impacts on international health, and methods and strategies to address them.

H 529. INTERNATIONAL HEALTH (3). Overview of the epidemiological, economic, political, sociological, and cultural factors that impact on international health. Special emphasis on the methods of prevention/intervention utilized in coping with health problems on an international level.

H 530. HEALTH POLICY ANALYSIS (3). Analysis of public policies affecting health care programs, services and organizations and the impact of those programs on citizens; processes by which

health policy proposals are generated, promoted, defeated, modified and implemented.

H 531. HEALTH CARE MARKETING (3). Principles, elements and methods of marketing health care services. Role of the consumer, governing body, administration and medical staff as well as impact of professional ethics.

H 532. ECONOMIC ISSUES IN HEALTH AND MEDICAL CARE (3). Application of economics principles to the health care field: the demand for medical care and insurance, health care suppliers, health care markets. **PREREQS:** ECON 201

H 533. HEALTH SYSTEMS ORGANIZATION (3). Examines the nature of health and health care services and reviews the role of government and the free market on health services. Alternative ways of organizing, financing, and delivery of health care services are explored.

H 534. HEALTH CARE LAW AND REGULATION (3). Legal aspects of health care delivery; tort law and its applications; professional liability and liability insurance; laws relative to health care institutions, cost controls, antitrust and access.

H 536. HEALTHCARE ORGANIZATION THEORY AND BEHAVIOR (3). Administrative practice in health care settings with emphasis on long-term care and acute care services. Provides a framework for health care systems and managerial process and roles. Focus on operations, planning, marketing, human resources, finance, productivity and control as well as emerging trends in health services.

H 538. PUBLIC AND PRIVATE HEALTH INSURANCE (3). Introduction to the principles and practices of public or social and commercial health insurance, and their financial reimbursement mechanisms.

H 539. HEALTH CARE INFORMATION SYSTEMS (3). Information systems in health care institutions, programs, and services; review of managerial information needs and data collection and reporting mechanisms.

H 540. WATER AND HUMAN HEALTH (3). Critically examine the complex relationship between water quality, human activities, and population health.

H 541. AIR QUALITY AND HUMAN HEALTH (3). Examination of the major sources of air pollution, its impact on ecosystems and climate change, and population health. Will also discuss technologies and introduce regulations that are used to control air pollutants.

H 544. ENVIRONMENTAL AND OCCUPATIONAL EPIDEMIOLOGY (3). Examines exposure assessment methodology and epidemiological study designs that are commonly used in environmental and occupational health science in order to characterize the impact of environmental and occupational exposures on population health. **PREREQS:** H 525 and a graduate level statistics course.

H 545. OCCUPATIONAL HEALTH (3). A broad overview of occupational health including recognizing and preventing risks from toxic chemical, radiation and physical hazards in the workplace.

H 546. ENVIRONMENTAL AND OCCUPATIONAL SAMPLING (4). An overview of environmental and occupational sampling principles and practices for anticipating, recognizing, evaluating, and controlling exposures is provided.

H 548. ENVIRONMENTAL & OCCUPATIONAL TOXICOLOGY & RISK ASSESSMENT (3). Introduction to the basic principles of toxicology and risk assessment as they apply to environmental and occupational health. **PREREQS:** One year basic college chemistry and biology and two terms organic chemistry.

H 549. MASS MEDIA AND HEALTH (3). Examines the effects of mass media on population health, from the negative impact of advertising of

cigarettes, alcohol and junk food, to the (hopefully) positive impact of public health campaigns. **PREREQS:** H 571

H 552. DISASTER EPIDEMIOLOGY (3). Describe the impact of natural and manmade disasters on human health, understand epidemiologic methods specific to disasters, and apply fundamental epidemiologic methods to identify and characterize disaster-related adverse health outcomes. **PREREQS:** H 525

H 554. EPIDEMIOLOGY OF AGING (3). An overview of the core principles of the epidemiology of aging is provided. There will be an emphasis on health and disease processes in older adults. Students will learn essential study design and analytic issues that may arise in studies of aging. **PREREQS:** H 525

H 555. CANCER EPIDEMIOLOGY (3). Introduction to basic concepts and methodology in cancer epidemiology. **PREREQS:** H 525

H 556. STRATEGIC MANAGEMENT OF HEALTH SERVICE ORGANIZATIONS (3). Theories and methodologies of long-range planning and strategic management in health care organizations.

H 557. FINANCIAL MANAGEMENT OF HEALTH CARE ORGANIZATIONS (3). Utilization of standard financial tools needed to manage the capital resources of health care organizations. Includes funding capital projects, product costing, budgeting methods, capital formation and investment strategies. **PREREQS:** H 210 and H 250

H 558. REIMBURSEMENT MECHANISMS (3). Techniques used in cost-effectiveness analysis. Examples are drawn from the public health and health economics literature. **PREREQS:** Graduate standing.

H 559. CONTRACTS AND NEGOTIATION (3). Different negotiation styles and strategies used in healthcare contracting are explored—distributive, integrative, and mixed motive negotiation styles. Students examine various contracts and the role the healthcare administrator plays in a variety of health care settings.

H 560. PUBLIC HEALTH SURVEILLANCE (3). An introduction to public health surveillance systems (national and international) for chronic and infectious diseases. Utility of existing surveillance systems for secondary epidemiological data analysis. **PREREQS:** H 524 and H 525 or instructor's consent.

H 561. SEXUALITY: A HEALTH SCIENCE PERSPECTIVE (3). Exploration of the meaning of sexuality from a variety of contemporary health science perspectives; aspects of sex and sexuality fundamental to total health; issues central to the health educator role examined. **PREREQS:** Graduate standing.

H 562. INFECTIOUS DISEASE EPIDEMIOLOGY (3). Understand epidemiologic methods specific to infectious diseases, apply fundamental epidemiologic methods to infectious disease questions, and describe the broad trends in global infectious disease burden. The application methods and principles will be explored through lectures, discussions, assignments and writing projects. **PREREQS:** H 525

H 564. COMPUTING TOOLS AND HEALTH DATA ANALYSIS (3). Modern computational biostatistics for analyzing health data, emphasizing important technologies and methods for data processing and understanding of how they work. Topics will evolve over time as new procedures are developed. **PREREQS:** (H 524 or HDFS 530)

H 565. PUBLIC HEALTH AND WOMEN: SOCIAL AND POLICY ISSUES (3). Public health approach to the identification of women's health needs in the United States and in other countries as it relates to the intersection of race, ethnicity, social class, sexual orientation, age, and ability. **PREREQS:** 6 credits in public health.

H 566. DATA MINING IN PUBLIC HEALTH (3). An introduction to high-dimensional data analysis and data mining techniques used as an information technology tool to extract previously unknown and potentially useful information from large databases in biology, medicine, and public health. **PREREQS:** H 581 or permission of instructor; H 564 recommended.

H 567. LONG-TERM CARE ALTERNATIVES (3). Overview of the long-term care alternatives. Comparisons of nursing homes with community based facilities; adult day care centers, respite to hospice facilities, social HMOs and other services; cost, quality of life and practicality are addressed.

H 568. FINANCING AND ADMINISTRATION OF LONG-TERM CARE (3). Examines the financing and administration of long term care. Emphasis is on a system-wide overview and specific application to nursing facility management.

H 569. MATERNAL AND CHILD HEALTH (3). Women's reproductive health and health of children stressing causation, management, and prevention of public health problems. Epidemiological analysis of morbidity and mortality in children and women of childbearing age; impact of social, political and economic influences on the health of women and children; comparison of issues and problems of industrialized versus developing nations. Consideration of health issues of interest to the many diverse racial and ethnic groups of women and children in the U.S. as well as the global village.

H 570. WORKFLOW OF DATA ANALYSIS (3). Covers the management of workflow for studies involving data management and coordination including planning the work, documenting activities, creating, validating, and verifying variables, statistical analyses, replicating findings, and archiving work. Emphasizes tight control of data management: making changes to data in a documented and replicable manner. Lec/rec. **PREREQS:** HDFS 532 and /or equivalent or permission of instructor.

H 571. PRINCIPLES OF HEALTH BEHAVIOR (3). Theoretical approaches to behavior change in health promotion/education research and practice; factors influencing health behaviors, ethical behavior change issues, behavioral interventions for special populations.

H 572. COMMUNITY ORGANIZATION FOR HEALTH PROMOTION AND EDUCATION (3). History, theory, and practice of community organizing for health advocacy; focus on group processes, use of media, leadership, coalitions, grass roots methods and social change.

H 573. INTRODUCTION TO MULTILEVEL/ HIERARCHICAL MODELS (3). Introduction to the theory and application of hierarchical models to problems in epidemiology and public health. Hierarchical models will be dealt with using both frequentist and Bayesian frameworks. **PREREQS:** H 581 or permission of instructor.

H 574. PUBLIC HEALTH AND VIOLENCE IN SOCIETY (3). Examination of violence as a major public health issue. Historical, social, environmental, economic, behavioral and psychological aspects of assaultive violence, spousal abuse, rape and sexual assault, child abuse, child sexual abuse, suicide, the effects of the media on violence, drug abuse and violence, and related public health problems in contemporary American society. Emphasis on health and the efficacy of current efforts aimed at ameliorating these problems and potential for alternative public health models for prevention and intervention.

H 575. EVALUATION OF HEALTH PROMOTION AND EDUCATION PROGRAMS (3). Provides theoretical and practical bases for program evaluation. Develops basic skills in a variety of approaches to evaluation, including techniques that are particularly suitable for evaluating health promotion, community health improvement, and

related health and social services programs. Course learning is synthesized through designing an evaluation framework and methodology for a relevant program. **PREREQS:** H 515 and /or instructor consent.

H 576. PROGRAM PLANNING/PROPOSAL WRITING IN HEALTH/HUMAN SERVICES (4). Planning and preparing of proposals for program initiation, financing, delivery and evaluation in health-related settings; emphasis on funding sources, community, individual, and organizational support. **PREREQS:** 9 credits of graduate course work in public health.

H 577. DIETARY INTERVENTIONS FOR PUBLIC HEALTH (3). A public health perspective on the practice of population-based dietary intervention. Examination of relevant theories, research, and practice that pertain to health promoters/educators. CROSSLISTED as NUTR 477/NUTR 577. **PREREQS:** NUTR 225

H 578. INTRODUCTION TO MOLECULAR EPIDEMIOLOGY I (3). A survey of and introduction to the methods and issues arising in genetics and molecular epidemiology, including key biostatistical methods, study designs, and technologies used in the conduct of these studies. Students will gain experience conducting critical reviews of research papers with respect to study design and biostatistical analysis. **PREREQS:** (H 524 and H 526) and knowledge of and familiarity with basic concepts of molecular biology (DNA replication, transcription, and translation).

H 579. MOLECULAR EPIDEMIOLOGY II (3). An introduction to the data analysis methods arising in genetics and molecular epidemiology. Students will obtain hands-on experience with the analysis of high-throughput data obtained from population-based molecular studies. Lec/lab. **PREREQS:** (H 578 and H 581) and H 564

H 580. LINEAR REGRESSION AND ANALYSIS OF TIME TO EVENT DATA (4). Multiple linear regression analysis for measurement data and survival analysis methods for time to event health data, including modes of inference, diagnostics, model selection, and reporting conclusions. Lec/lab. **PREREQS:** (H 524 or HDFS 530)

H 581. GENERALIZED LINEAR MODELS AND CATEGORICAL DATA ANALYSIS (4). Biostatistical methods focusing on binary and count data will provide a foundation for understanding and implementing generalized linear regression and categorical data models that are commonly used to analyze epidemiological and public health data from cohort, case-control, and clinical trial study designs. Lec/lab. **PREREQS:** H 580

H 582. ANALYSIS OF CORRELATED HEALTH DATA (3). Biostatistical methods for clustered, repeated measures, and longitudinal correlated health data, with an introduction to applications of linear and generalized linear mixed models and generalized estimating equations. **PREREQS:** H 581

H 583. ENVIRONMENTAL AND OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT (3). The management principles and practices in the environment, safety and health profession are examined.

H 584. ANALYSIS OF INTERVENTION STUDIES AND CLINICAL TRIALS (3). Principles of data analysis from intervention studies and clinical trials, including professional graphical and tabular presentation, reproducibility and reliability of measurements, and controlling the Type I error rate when analyzing multiple endpoints. Basic principles of designing experiments are also covered including blocking, stratification, interaction, and control of variability. **PREREQS:** (H 524 or HDFS 530)

H 585. ENVIRONMENT, SAFETY AND HEALTH POLICY AND LAW (3). Survey of the environment, safety and health policy and law in the United States. Furnishes the basic knowledge and general understanding about policy and

law-related issues important to all environmental health and safety professionals. **PREREQS:** H 385 or graduate standing.

H 586. BAYESIAN BIOSTATISTICS IN PUBLIC HEALTH (3). An examination of methods for designing and implementing Bayesian analysis to address scientific questions through hands-on experience with health data. This survey course also covers proper interpretation and communication of results from practical Bayesian methods for biostatistics data analysis, with illustrations of the utility of Bayesian ideas in public health. **PREREQS:** H 581

H 587. TIME TO EVENT ANALYSIS OF HEALTH DATA (3). Biostatistical models and methods for survival analysis of time to event data that are routinely encountered in biomedical and health research. **PREREQS:** (H 524 or HDFS 530)

H 588. APPLIED OCCUPATIONAL SAFETY AND HEALTH (3). The management and technical aspects of a workplace safety and health program are identified and assessed. Students completing the course receive a 30-hour OSHA General Industry card.

H 589. EMERGENCY AND DISASTER MANAGEMENT (3). Study of preparedness, response, recovery and business resumption strategies, activities and applications needed to effectively deal with emergency and disaster incidents.

H 591. SELECTED TOPICS (1-3). Recent changes and advances in public health and health care administration and their application to special fields of study. Topics vary from term to term and year to year. This course is repeatable for a maximum of 9 credits. **PREREQS:** Graduate standing.

H 592. SPATIAL BIOSTATISTICS AND EPIDEMIOLOGY (3). Epidemiologic and biostatistical methods for spatial analysis of health data. Topics include risks and rates, types of spatial data, visualizing spatial data, analysis of spatial point patterns, spatial clustering of health events based on case-control studies and based on regional counts, linking spatial exposure data to health events through regression modeling. **PREREQS:** H 581

H 594. APPLIED ERGONOMICS (3). Principles of occupational ergonomics for managing optimal worker performance and well-being.

H 595. DESIGN FOR ENVIRONMENT, SAFETY, AND HEALTH (3). Systematic consideration of environmental, safety, and health concerns at the earliest possible stage in the lifecycle design engineering of products, technologies, and manufacturing processes. **PREREQS:** Graduate standing.

H 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 24 credits.

H 601. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

H 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

H 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 608. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 610. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 612. DOCTORAL SEMINAR IN PUBLIC HEALTH: RESEARCH AND PRACTICE (1). Contemporary research and professional issues specific to the discipline of public health. Includes responsible conduct of research, writing for publication, professional development and leadership, and faculty research in public health. This course is repeatable for a maximum of 9 credits. **PREREQS:** Restricted to public health doctoral students.

H 613. INDEPENDENT RESEARCH PROJECT (1-9). Independent research project for PhD students, including research design, execution or research, and the formal presentation of findings in written form. Student will develop an original research topic based on knowledge and review of the literature in a public health-relevant area of inquiry. Graded P/N. This course is repeatable for a maximum of 9 credits.

H 614. RESEARCH MANUSCRIPT (4). PhD students write a manuscript to submit to a peer-reviewed journal as part of the course requirements. Graded P/N.

H 615. ADVANCED EVALUATION AND RESEARCH DESIGN (3). Provides an in-depth examination of advanced research designs and methods for establishing causal statements about the efficacy, effectiveness and generalizability of public health and social service interventions designed to alter public health and social risk or protective factors. **PREREQS:** H 515 and H 575 or instructor permission.

H 630. ADVANCED TOPICS IN HEALTH POLICY ANALYSIS (3). Survey and analyze the healthcare system in the United States, with an emphasis on new and emerging issues. An important aspect of the course will be to analyze past, present and potential solutions to improve the performance of the U.S. health system. **PREREQS:** H 530

H 632. ECONOMIC ISSUES IN HEALTH AND MEDICAL CARE (3). Demonstrate how economists think about healthcare issues. Emphasis on looking at a wide variety of health-related topics from an economist's perspective. By the end of the course, students should have a sense of how to use economic theory and empirical analysis to evaluate health policy issues.

H 635. COST EFFECTIVENESS ANALYSIS IN HEALTH AND MEDICAL CARE (3). The primary objective of this course is to introduce students to cost-effectiveness studies in health and medical care. Covers the core concepts of CEA, quality adjusted life years, cost calculations, and decision rules.

H 638. PUBLIC AND PRIVATE HEALTH INSURANCE (3). Introduction to the principles and practices of public or social and commercial health insurance, their finance mechanisms, and theoretical foundation behind the selection of certain system of health insurance and finance method. **PREREQS:** H 533

H 639. COMMUNITY-BASED PARTICIPATORY RESEARCH (4). Focuses on initiating and conducting research in partnership with communities. Includes in-depth examination of community-based participatory research (CBPR) elements, principles, theories, and approaches; how researchers can successfully partner with communities; and research with minority and/or underprivileged communities; with examples from environmental health, gerontology, and health promotion. **PREREQS:** 9 credits of public health (H) or human development and family sciences (HDFS) graduate course work.

H 642. ENVIRONMENTAL AND REGULATORY RISK ASSESSMENT (3). Understand concepts, principles and practices in modern risk analysis and how they are utilized to make evidence-based decisions in public health. Focus will be on real world examples of risk assessment by environmental and occupational regulatory agencies.

H 643. SUSTAINABLE DEVELOPMENT AND ENVIRONMENTAL HEALTH (3). Introduction to the concepts and practices of sustainable development by examining the environmental, social, and economic dimensions of human health.

H 659. HEALTH POLICY RESEARCH METHODS (3). Familiarize doctoral students with the health policy research literature and selected questions in the field. The focus is an in-depth exploration of the research methods and technical details of the research literature. **PREREQS:** (H 515 and H 524)

H 671. ADVANCED THEORIES OF HEALTH BEHAVIOR (3). Provides an in-depth examination of major theories of health behavior (both health compromising and health enhancing). **PREREQS:** H 571 or permission of instructor.

H 672. ADVANCED QUALITATIVE METHODS IN HEALTH BEHAVIOR (3). Provides an in-depth examination of the use of qualitative methods in health behavior research and practice. **PREREQS:** H 515 and SOC 518 and HDFS 538; or permission of instructor.

H 673. MEASUREMENT OF HEALTH BEHAVIOR CONCEPTS (4). Provides in-depth study and field work for graduate students in public health and related fields of the methods used in the conceptualization, development, and evaluation of quantitative measures of health behavior and related concepts. **PREREQS:** H 524, H 515, and 3 credits in other quantitative research methods or social behavioral methods (e.g., in sociology or psychology or health promotion or education programs) or equivalents, or permission of instructor.

H 675. DEVELOPMENT OF HEALTH BEHAVIOR INTERVENTIONS (3). Examines the application of social/behavioral theories in health promotion interventions and in conducting intervention research in diverse populations. The course will focus on program development, on implementation strategies, and on translation into practice. **PREREQS:** (H 571 and H 575 and H 576) or equivalents or consent of instructor.

H 676. ADVANCED TOPICS IN HEALTH PROMOTION AND HEALTH BEHAVIOR (3). Examines topics of relevance to health promotion and health behavior. Specific topics include current issues and emerging research findings, with a focus on social and behavior science perspectives, analysis of public health problems, and application of principles and practices of health promotion and health behavior. This course is repeatable for a maximum of 6 credits. **PREREQS:** H 515 and H 571 or permission of instructor.

H 681. ADV TOPICS IN ENVIRONMENTAL & OCCUPATIONAL HEALTH & SAFETY (3). Advanced topics in the environment, safety and health discipline. Content varies with each offering.

H 682. ENVIR & OCCUP HLTH & SAFE: MOVING FROM RESEARCH TO PRACTICE (3). An examination of research transfer models that can be adapted and implemented to environmental and occupational settings. Case studies and content will vary with each course offering.

H 685. RACE, CLASS, CULTURE AND AGING (4). Examines the diversity among the older population in health status, health beliefs/behaviors, and health care, and explores the interaction of culture and structure as determinants of their life chances. The empirical literature used in the course is drawn from the experiences of aging of African-American, Latino, and Asian-Pacific Islander elderly. Taught spring term even years. **CROSSLISTED** as HDFS 685. **PREREQS:** 9 credits of public health or HDFS graduate course work, or permission of instructor.

H 699. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 16 credits.

HEALTH AND HUMAN SCIENCES

HHS 220. COMMUNITY EDUCATION PROGRAMS AND PRACTICES: EXTENSION SYSTEM (2). Theory and practice of community education programs; evolution of land-grant university outreach programs; emphasis on addressing current issues and engaging diverse audiences through responsive instructional practices; some site visits.

HHS 231. *LIFETIME FITNESS FOR HEALTH (2). Physical activity and positive health behaviors in human health; topics include physical fitness, nutrition, weight control, stress management, addictive behaviors, and sexually transmitted infections. Lec/lab. (Bacc Core Course)

HHS 241. *LIFETIME FITNESS (1). Assessment, evaluation and practice of physical fitness and health behaviors leading to the development of a personal fitness program. (Bacc Core Course)

HHS 242. *LIFETIME FITNESS FOR HEALTH: CARDIO CONDITIONING LAB (1). Assessment, evaluation and practice of physical fitness and health behaviors; development of a personal fitness program with a focus on aerobic exercise. (Bacc Core Course)

HHS 243. *LIFETIME FITNESS: RESISTANCE TRAINING (1). Assessment, evaluation and practice of physical fitness and health behaviors; development of a personal fitness program with a focus on muscular fitness. (Bacc Core Course)

HHS 244. *LIFETIME FITNESS: WEIGHT MANAGEMENT (1). Assessment, evaluation and practice of physical fitness and health behaviors; development of a personal fitness program focusing on maintaining or achieving a healthy body composition. (Bacc Core Course)

HHS 245. *LIFETIME FITNESS: RUNNING (1). Assessment, evaluation and practice of physical fitness and health behaviors; development of a personal fitness program with a focus on running as a physical activity. (Bacc Core Course)

HHS 246. *LIFETIME FITNESS: WALKING (1). Assessment, evaluation and practice of physical fitness and health behaviors; development of a personal fitness program with a focus on walking as a physical activity. (Bacc Core Course)

HHS 247. *LIFETIME FITNESS: AQUATIC EXERCISE (1). Assessment, evaluation and practice of physical fitness and health behaviors; development of a personal fitness program focusing on aquatic exercise as the physical activity. (Bacc Core Course)

HHS 248. *LIFETIME FITNESS: YOGA (1). Assessment, evaluation and practice of physical fitness and health behaviors; development of a personal fitness program with a focus on yoga activities. (Bacc Core Course)

NUTRITION COURSES

NUTR 104. ORIENTATION: NUTRITION AND FOOD MANAGEMENT (1). Identify professional resources, job opportunities, markets and trends. Study academic and professional requirements for successful entry into professional careers in dietetics, food systems management, foods in business, and nutrition science. Graded P/N.

NUTR 199. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

NUTR 216. *FOOD IN NON-WESTERN CULTURE (3). Cultural determinants influencing food habits of humans. Interrelation of eating patterns and socio-cultural, ecological, psychological and economic factors in cross-cultural settings. Roles of men and women in food provision. Lec/rec. (Bacc Core Course)

NUTR 225. GENERAL HUMAN NUTRITION (3). The relationship of food, its nutrients and other components to the promotion of health and fitness with emphasis on the young adult. Current health

concerns on a national and international level. This course is for non-majors; NES majors and those in the health sciences should take NUTR 240.

NUTR 235. SCIENCE OF FOODS (5). Composition, functional properties, and structure of foods, including modified ingredients. Principles underlying preparation of food products of standard quality. Lec/lab. **PREREQS:** (CH 123 or CH 223 or ((CH 263 or CH 263H or CH 273) and (CH 233 or CH 233H))

NUTR 240. HUMAN NUTRITION (3). An introductory nutrition course for exercise science, nutrition, dietetics, food science, and health science majors who have taken general chemistry. Concepts of nutrient metabolism and utilization, nutrient deficiencies and toxicities and their relationship to disease prevention and treatment. **PREREQS:** (CH 121 or CH 224H or (CH 221 or CH 231 or CH 231H)) and may be taken concurrently with NUTR 241.

NUTR 241. APPLICATIONS IN HUMAN NUTRITION (1). Application of nutrition theory from NUTR 240 using a dietary project and hands-on recitation activities. A key focus of the course will be on applying nutrition theory. Rec. **PREREQS:** NUTR 240*

NUTR 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

NUTR 306. PROJECTS (1-16). This course is repeatable for a maximum of 36 credits. **PREREQS:** Departmental approval required.

NUTR 311. FOODSERVICE PRODUCTION AND PURCHASING (4). Food production, purchasing, facility and materials management in foodservice operations. Quantity production styles, safety and sanitation, service methods and equipment. Lec/lab/rec. **PREREQS:** NUTR 235

NUTR 312. *ISSUES IN NUTRITION AND HEALTH (3). Impact of nutrition as one component of complex environmental, behavioral, social, and genetic factors significant to health promotion. Apply scientific knowledge to current health issues of changing dietary patterns, technological development in food products and nutrition controversies. Recognize economic and public policy implications. Lec/rec. (Bacc Core Course) **PREREQS:** (NUTR 225 or NUTR 240) and completion of science requirement in baccalaureate core.

NUTR 319. PROMOTING FOOD AND NUTRITION (3). Strategies in promoting products, services or ideas; negotiating, advertising, public policy, consumer service, social marketing, market research, trends and strategies. Lec/lab. **PREREQS:** (NUTR 240 or NUTR 241)

NUTR 325. NUTRITION THROUGH THE LIFE CYCLE (3). Nutritional needs and concerns in pregnancy and lactation, infancy, childhood, adolescence, adult and later years. **PREREQS:** ((NUTR 240 or NUTR 225) and NUTR 241) and / or equivalent, junior standing recommended.

NUTR 340. PRINCIPLES OF NUTRIENT METABOLISM (3). Cellular mechanism for digestion and utilization of nutrients; structure and function of macronutrients; nutrients and gene expression; relationship of nutrition to human health. **PREREQS:** (NUTR 240 and NUTR 241 and CH 331) and NUTR 241 or equivalents.

NUTR 341. NUTRITION FOR EXERCISE (3). Review the interrelationship between nutrition and exercise, including macronutrient, micronutrient and fluid needs for active individuals. **PREREQS:** (EXSS 324 and NUTR 240)

NUTR 399. SPECIAL TOPICS (1-3). This course is repeatable for a maximum of 16 credits.

NUTR 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

NUTR 403. THESIS (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

NUTR 405. READING AND CONFERENCE (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

NUTR 406. SPECIAL PROBLEMS; PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

NUTR 407. SEMINAR (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

NUTR 408. WORKSHOP (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

NUTR 409. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

NUTR 410. FIELD EXPERIENCE (3-15). Supervised work experience with professional-level responsibilities in community agency or business firm. Supplementary conferences, readings, reports. Supervised by agency/firm and instructor. For advanced students. Applications made and approved term preceding enrollment. Graded P/N. This course is repeatable for a maximum of 50 credits.

NUTR 416. ^CULTURAL ASPECTS OF FOODS (3). Regional, ethnic, and religious influences on food patterns; worldwide trends in food practices. Laboratory experience with foods from several cultures. Lec/lab. (Writing Intensive Course) **PREREQS:** NUTR 235

NUTR 417. HUMAN NUTRITION SCIENCE (4). Application of biochemistry and physiology to nutrition of the individual. **PREREQS:** (NUTR 340 and BB 350) and /or equivalent courses and one physiology course.

NUTR 418. HUMAN NUTRITION SCIENCE (4). Application of biochemistry and physiology to nutrition of the individual. **PREREQS:** NUTR 417 and biochemistry, physiology.

NUTR 419. HUMAN NUTRITION LABORATORY (3). Techniques of nutritional assessment; laboratory experiences covering basic nutrition and chemical assays. Lab fee. Lec/lab. **PREREQS:** NUTR 417

NUTR 420. MEDICAL NUTRITION THERAPY (5). Application of nutrition principles to diseases/disorders that may alter nutritional requirements or respond to dietary modification. Lecture and case study. Lec/lab. **PREREQS:** NUTR 418*

NUTR 423. COMMUNITY NUTRITION (4). Meeting nutritional needs in community settings; nutritional status of individuals and groups; programs of public and private agencies and industry; intervention techniques. Roles of community nutritionist. **PREREQS:** NUTR 325

NUTR 439. ^COMMUNICATIONS IN DIETETICS (3). Theory and practice in food and nutrition communications in dietetics. Experience in nutritional counseling and interviewing, employee training and nutritional education materials development, public speaking, and media presentation strategies. (Writing Intensive Course) **PREREQS:** NUTR 325 and NUTR 417*

NUTR 446. MANAGING FOOD AND NUTRITION SERVICES (4). Overview of organizational structure, functions of managers in food and nutrition service organizations: human and financial resources, regulatory influences, health care organizations, current issues in operations. Lec/rec. **PREREQS:** NUTR 311

NUTR 447. MANAGEMENT OF FOOD SYSTEMS LABORATORY (3). Application of theory in managing a university food service as part of a student team: planning, production, projecting resource needs, evaluation of outcomes and financial goals. **PREREQS:** NUTR 446 or NUTR 546

NUTR 477. DIETARY INTERVENTIONS FOR PUBLIC HEALTH (3). A public health perspective on the practice of population-based dietary intervention. Examination of relevant theories, research, and practice that pertain to health promoters/educators. CROSSLISTED as H 477/H

577. **PREREQS:** NUTR 225

NUTR 499. SPECIAL TOPICS IN DIETETICS (2-6). Current issues, trends, and topics in nutrition and dietetics. May be repeated for credit when topic varies. This course is repeatable for a maximum of 12 credits.

NUTR 501. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

NUTR 502. INDEPENDENT STUDY (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

NUTR 503. THESIS (1-16). Graded P/N. This course is repeatable for a maximum of 999 credits.

NUTR 505. READING AND CONFERENCE (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

NUTR 506. SPECIAL PROBLEMS; PROJECTS (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

NUTR 507. SEMINAR (1-16). 1 credit graded P/N. This course is repeatable for a maximum of 16 credits.

NUTR 508. WORKSHOP (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

NUTR 509. PRACTICUM (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

NUTR 510. FIELD EXPERIENCE: INTERNSHIP (1-16). Supervised work experience with professional-level responsibilities in community agency or business firm. Supplementary conferences, readings, reports. Supervised by agency/firm and instructor. Limited to students admitted to degree program. Application made and approved in the term preceding enrollment. No more than 6 credits may be applied to a master's degree program. This course is repeatable for a maximum of 6 credits.

NUTR 514. HEALTH BENEFITS OF FUNCTIONAL FOODS, NUTRACEUTICALS, DIETARY SUPPLEMENTS (3). Functional foods, nutraceuticals and dietary supplements represent a rapidly expanding segment of domestic and international markets. This course will overview the principles and procedures necessary to evaluate and market these products. The chemistry and mechanisms of major nutraceutical ingredient categories and current scientific information supporting their biochemical and physiological efficacy will be addressed. Special dietary products, such as medical, weight control, sport, and herbal supplements, will be addressed. Regulatory aspects of labeling and structure-function claims will be covered. **CROSSLISTED** as FST 514. **PREREQS:** BB 350 and CH 332

NUTR 516. CULTURAL ASPECTS OF FOODS (3). Regional, ethnic, and religious influences on food patterns; worldwide trends in food practices. Laboratory experience with foods from several cultures. Lec/lab. **PREREQS:** NUTR 235

NUTR 517. HUMAN NUTRITION SCIENCE (4). Application of biochemistry and physiology to nutrition of the individual. **PREREQS:** NUTR 340 and BB 350 and/or equivalent courses and one physiology course.

NUTR 518. HUMAN NUTRITION SCIENCE (4). Application of biochemistry and physiology to nutrition of the individual. **PREREQS:** NUTR 517 and biochemistry, physiology.

NUTR 519. HUMAN NUTRITION LABORATORY (3). Techniques of nutritional assessment; laboratory experiences covering basic nutrition and chemical assays. Lab fee. Lec/lab. **PREREQS:** NUTR 417 or NUTR 517

NUTR 520. MEDICAL NUTRITION THERAPY (5). Application of nutrition principles to diseases/disorders that may alter nutritional requirements or respond to dietary modification. Lecture and case study. Lec/lab. **PREREQS:** NUTR 418 or NUTR 518

NUTR 523. COMMUNITY NUTRITION (4). Meeting nutritional needs in community settings; nutritional status of individuals and groups; programs of public and private agencies and industry; intervention techniques. Roles of community nutritionist. **PREREQS:** NUTR 325

NUTR 535. NUTRITION AND EXERCISE: MACRONUTRIENTS AND ENERGY METABOLISM (3). Current research examining the interrelationship of macronutrients and exercise and energy balance will be reviewed, including their roles in health, disease prevention and exercise performance. **PREREQS:** NUTR 517 or EXSS 533 or equivalent.

NUTR 539. COMMUNICATIONS IN DIETETICS (3). Theory and practice of food and nutrition communications in dietetics. Experience in nutritional counseling and interviewing, employee training and nutritional education materials development, public speaking, and media presentation strategies. **PREREQS:** NUTR 325

NUTR 546. FOODSERVICE ORGANIZATIONS (3). Overview of organizational structure, functions of managers in foodservice organizations: human resources, regulatory influences, health care organizations, current issues in operations. Lec/rec. **PREREQS:** NUTR 311 and NUTR 445

NUTR 550. NUTRITIONAL STATUS (4). Research studies with emphasis on estimation of nutrient intake and assessment of nutritional status, including biochemical, clinical, epidemiological and anthropometric measures. Interpretation of status indicators. **PREREQS:** NUTR 418 or NUTR 518

NUTR 577. DIETARY INTERVENTIONS FOR PUBLIC HEALTH (3). A public health perspective on the practice of population-based dietary intervention. Examination of relevant theories, research, and practice that pertain to health promoters/educators. **CROSSLISTED** as H 477/H 577. **PREREQS:** NUTR 225

NUTR 599. SPECIAL TOPICS IN NUTRITION (3-6). Current issues, trends, and topics in nutrition and health. May be repeated for credit when topic varies. This course is repeatable for a maximum of 18 credits.

NUTR 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

NUTR 602. INDEPENDENT STUDY (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

NUTR 603. THESIS (1-16). Graded P/N. This course is repeatable for a maximum of 999 credits.

NUTR 605. READING AND CONFERENCE (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

NUTR 607. SEMINAR (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

NUTR 609. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

NUTR 610. INTERNSHIP (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

NUTR 617. METABOLIC INTERRELATIONSHIPS IN NUTRITION (1-16). Interrelationships between nutrients and metabolism at the cellular and human level as influenced by external and internal factors, including age, and environment. NUTR 617 and NUTR 618 may be taken out of order. Offered alternate years. This course is repeatable for a maximum of 16 credits. **PREREQS:** NUTR 418 or NUTR 518

NUTR 618. METABOLIC INTERRELATIONSHIPS IN NUTRITION (3). Interrelationships between nutrients and metabolism of humans at the cellular level as influenced by external and internal factors. NUTR 617 and NUTR 618 may be taken out of order. Offered alternate years. **PREREQS:** NUTR 418 or NUTR 518

NUTR 699. SPECIAL TOPICS IN NUTRITION RESEARCH (3-16). Current issues, trends, and topics in nutrition research. May be repeated for credit when topic varies. This course is repeatable for a maximum of 16 credits.

■ PHYSICAL ACTIVITY COURSES

PAC 100. ADAPTED PHYSICAL ACTIVITY (1). Individual workout for students with permanent or temporary physical disabilities and for students enrolled in another PAC who sustain an injury. This course is repeatable for a maximum of 11 credits.

PAC 102. AQUA AEROBICS (1). Fitness class using a variety of movements in shallow and deep water, mostly in a vertical position. Do not need swimming skills. This course is repeatable for a maximum of 11 credits.

PAC 103. DEEP WATER AEROBICS (1). Fitness class using a variety of movements in a deep water pool, mostly in a vertical position. Should be comfortable in deep water. This course is repeatable for a maximum of 11 credits.

PAC 107. DANCE AEROBICS (1). Fitness class set to music using a variety of movement; high/low intensity cardiovascular workout supplemented with strength and flexibility exercises. This course is repeatable for a maximum of 11 credits.

PAC 108. STEP AEROBICS (1). Low-impact, high intensity workout adjustable to all fitness levels utilizing adjustable height benches. Strengthening and flexibility exercises included. This course is repeatable for a maximum of 11 credits.

PAC 109. POWER STEP AEROBICS (1). Advanced high intensity step workout that includes plyometric jumps and movements through a wide range of motion. This course is repeatable for a maximum of 11 credits. **PREREQS:** PAC 108, Step Aerobics or equivalent.

PAC 113. BADMINTON I (1). Singles and doubles skills, practice, rules, strategies and play. This course is repeatable for a maximum of 11 credits.

PAC 114. BADMINTON II (1). Intermediate skill development in badminton. This course is repeatable for a maximum of 11 credits. **PREREQS:** Fundamental skills, rules and strategy of singles and doubles play.

PAC 116. BASKETBALL I (1). Fundamental basketball skills, drills, rules, strategies, and practice. Game play appropriate for the skill level. This course is repeatable for a maximum of 11 credits.

PAC 117. BASKETBALL COMPETITIVE (1). Team play, individual and team skills developed and refined, competitive round robin tournaments. This course is repeatable for a maximum of 11 credits. **PREREQS:** Prior competitive experience.

PAC 120. MOUNTAIN BIKING (1). Touring trails in Corvallis area; riding techniques, safety, maintenance, environmental concerns. Required equipment: mountain bike, tire repair kit, helmet. This course is repeatable for a maximum of 11 credits.

PAC 121. BILLIARDS (1). Skills, technique, strategy, game knowledge as introduction to billiards (pool), a «cue» sport; rules and gaming for variations of pocket billiards; practice and class tournament play. This course is repeatable for a maximum of 11 credits.

PAC 122. BODY SCULPTING (1). Fitness workout set to music using lighter resistance training aids such as dumbbells, resistance tubing, bands, and aerobic steps. This course is repeatable for a maximum of 11 credits.

PAC 123. BOWLING I (1). Fundamentals of the game including etiquette, spot bowling, natural hook and straight ball delivery, scoring, handicap computation, spare pickup, and error correction. Additional fee; equipment supplied. This course is repeatable for a maximum of 11 credits.

PAC 124. BOWLING II (1). Review and refinement of basic fundamentals of bowling. Emphasis on spot bowling, adjusting for lane conditions, choices in equipment, league play, and mental training. This course is repeatable for a maximum of 11 credits. **PREREQS:** Bowling I or equivalent.

PAC 126. CARDIO KICKBOXING I (1). High intensity group workout set to motivational music and combining skills and techniques from boxing, kickboxing, and other martial arts. This course is repeatable for a maximum of 11 credits.

PAC 127. CARDIO KICKBOXING II (1). Applies what students have learned in basic cardio kickboxing and increases the difficulty of combinations in a way that intensifies the workout in complexity and cardio training; sometimes referred to as turbo kickboxing. This course is repeatable for a maximum of 11 credits.

PAC 129. CARDIO COMBO (1). Combination of aerobic training classes that use music such as Cardio Kickboxing, Body Sculpture, Sports Conditioning, and/or Step Aerobics. Actual curriculum may vary with instructors. This course is repeatable for a maximum of 11 credits.

PAC 130. CONDITIONING (1). Total body approach to fitness, cardiorespiratory conditioning, muscular strength and endurance; flexibility emphasized. May follow a specific training format, e.g. ROTC section follows Army conditioning format. This course is repeatable for a maximum of 11 credits.

PAC 131. SNOWBOARD-SKI CONDITIONING (1). Strength, muscular endurance, flexibility, balance, and cardiovascular exercises specific to downhill skiing and snowboarding; designed to help prepare students for participation in these sports. This course is repeatable for a maximum of 11 credits.

PAC 133. DANCE: TAP I (1). Individual and group dance with specialized shoes; basic step technique and vocabulary; warm up exercises progressing into rhythmic combinations performed to music; culminates in full routine to music. This course is repeatable for a maximum of 11 credits.

PAC 135. BALLETSPOUT: BALLET SKILLS FOR ATHLETES (1). Fundamental ballet technique to enhance balance, agility, alignment, strength and rhythmic movement in sports. Stretching techniques and Pilates mat-work included. No prior dance experience needed. All students welcome. Additional fee for accompanist. This course is repeatable for a maximum of 11 credits.

PAC 136. DANCE: BALLET I (1). Introduction to basic ballet technique and aesthetics, terminology, alignment, stretch and strength exercises. No previous dance experience needed. Additional fee for accompanist. This course is repeatable for a maximum of 11 credits.

PAC 137. DANCE: BALLET II (1). Review and practice of beginning ballet technique, introduction of more advanced stretches, steps, and combinations. Additional fee for accompanist. This course is repeatable for a maximum of 11 credits. **PREREQS:** Ballet I or previous ballet experience.

PAC 138. DANCE: BALLET III (1). Intermediate and advanced ballet technique, comprehensive exploration of the discipline. Additional fee for accompanist. This course is repeatable for a maximum of 11 credits. **PREREQS:** Ballet II, previous comparable experience or instructor approval required.

PAC 140. DANCE: JAZZ I (1). Introduction to jazz dance, technique, isolations, and combinations. Different jazz styles are explored. No previous dance experience is necessary. This course is repeatable for a maximum of 11 credits.

PAC 141. DANCE: JAZZ II (1). Intermediate jazz technique, isolations and combinations. This course is repeatable for a maximum of 11 credits. **PREREQS:** Jazz I or comparable experience.

PAC 142. DANCE: JAZZ III (1). Advanced approach to jazz technique; challenging warm ups, combinations, and dances. Performance opportunity. This course is repeatable for a maximum of 11 credits. **PREREQS:** Jazz II, comparable experience, departmental approval required.

PAC 145. DANCE: MODERN I (1). Introduction to modern dance movement fundamentals. Technique, stretch, strength, and alignment are included, as well as an appreciation for movement expression. No previous dance experience needed. Additional fee for accompanist. This course is repeatable for a maximum of 11 credits.

PAC 146. DANCE: MODERN II (1). An intermediate level of modern dance technique and movement expression. Additional fee for accompanist. This course is repeatable for a maximum of 11 credits. **PREREQS:** Modern Dance I or comparable experience.

PAC 147. DANCE: MODERN III, OREGON DANCE PERFORMANCE (1). Modern dance advanced technical skills, compositions, and combinations. Additional fee for accompanist. This course is repeatable for a maximum of 11 credits. **PREREQS:** Previous intermediate modern dance experience or instructor approval.

PAC 148. DANCE: CUBAN SALSA I (MEN/WOMEN) (1). Foundations of Cuban Salsa (Casino) as well as Rueda de Casino with focus on musical development and fundamentals of leading and following in partner dance. This course is repeatable for a maximum of 11 credits.

PAC 150. CULTURAL WORLD DANCE (MEN/WOMEN) (1). Introduction to traditional dance forms from Europe, Israel, North America and Asia, focusing on movement, cultural heritage, history, and diversity. This course is repeatable for a maximum of 11 credits.

PAC 152. DANCE: SALSA I (MEN/WOMEN) (1). Steps and rhythmic accent of Salsa and Merengue style; fundamentals of leading and following; basic moves and combinations. No prior experience needed. This course is repeatable for a maximum of 11 credits.

PAC 153. DANCE: SALSA II (MEN/WOMEN) (1). Intermediate moves, rhythmic accents and step combinations of Salsa; development of leading and following. This course is repeatable for a maximum of 11 credits. **PREREQS:** PAC 152 and/or instructor approval.

PAC 154. DANCE: COUNTRY WESTERN I (MEN/WOMEN) (1). Focus on traditional Country Western Swing patterns. Emphasizes fundamentals of leading and following. Also including introduction to waltz, two-step, cowboy cha-cha and 10-step polka. This course is repeatable for a maximum of 11 credits.

PAC 155. DANCE: COUNTRY WESTERN II (MEN/WOMEN) (1). Build on CW I with advanced waltz, two-step, and cha-cha patterns; introduces schottische and East Coast swing. This course is repeatable for a maximum of 11 credits. **PREREQS:** Country Western I or instructor approval.

PAC 156. DANCE: COUNTRY WESTERN III (MEN/WOMEN) (1). Advanced two-step patterns and styling with a focus on musical interpretation; development of leading and following. This course is repeatable for a maximum of 11 credits. **PREREQS:** PAC 155

PAC 158. DANCE: BEGINNING SWING (MEN/WOMEN) (1). Introduction to single time, double time, and triple time (jitterbug) swing; variations for each style, covering most swing music rhythms. Emphasizes fundamentals of leading and following. Men/women. This course is repeatable for a maximum of 11 credits.

PAC 159. DANCE: BALLROOM I (MEN/WOMEN) (1). Posture and alignment, fundamentals of leading and following, basic steps and variations

for waltz, foxtrot, swing, tango, and cha-cha. This course is repeatable for a maximum of 11 credits.

PAC 160. DANCE: BALLROOM II (MEN/WOMEN) (1). Additional steps and patterns of popular ballroom dances. This course is repeatable for a maximum of 11 credits. **PREREQS:** PAC 159

PAC 161. DANCE: BALLROOM III (MEN/WOMEN) (1). Styling; additional dances: rumba, silver fox trot, and Viennese waltz; advanced dance figures for tango and cha-cha. This course is repeatable for a maximum of 11 credits. **PREREQS:** PAC 160

PAC 162. DANCE: SWING II (MEN/WOMEN) (1). Social dance focusing on Twenties-style Charleston, pure Balboa and Balboa-Swing, and Blues Dance. This course is repeatable for a maximum of 11 credits.

PAC 163. DANCE: LATIN I (MEN/WOMEN) (1). Latin dances including cha-cha, mambo, salsa, rumba, merengue, bolero, salsa, and paso doble. Emphasis on proper styling and technical execution of each dance; effective leading and following techniques. This course is repeatable for a maximum of 11 credits. **PREREQS:** PAC 159

PAC 164. DANCE: LATIN II (MEN/WOMEN) (1). Continuation of Latin Dance I; more advanced dance patterns in cha-cha, salsa, merengue, rumba and samba. Introduction to mambo and bolero; emphasis on technical and stylistic details of each dance. This course is repeatable for a maximum of 11 credits. **PREREQS:** Latin I.

PAC 165. DANCE: WEST COAST SWING (MEN/WOMEN) (1). Focus on style, technique and many different step patterns of the west coast swing dance. This course is repeatable for a maximum of 11 credits. **PREREQS:** (PAC 154 or PAC 159)

PAC 166. BALLROOM 2 STEP, HUSTLE (MEN/WOMEN) (1). Smooth, romantic social dance that is neither ballroom, Latin, nor swing but a rhythm dance identified as club-style, danced to contemporary ballad-like music. Hustle is fast-paced, swing-related dance to disco beat. Class encompasses intermediate step patterns, technique and styling, stationary, traveling patterns. This course is repeatable for a maximum of 11 credits. **PREREQS:** PAC 160

PAC 167. DANCE: LINDY HOP (MEN/WOMEN) (1). Ballroom dance style based on original eight-count swing dance evolved in Harlem ballrooms during the late 1920s; styling emphasized. This course is repeatable for a maximum of 11 credits. **PREREQS:** (PAC 158 or PAC 159)

PAC 168. DANCE: LINDY HOP II (MEN/WOMEN) (1). Intermediate patterns, syncopations, play techniques, and styling with a focus on musical interpretation in the Lindy Hop style; development of leading and following. This course is repeatable for a maximum of 11 credits. **PREREQS:** PAC 167

PAC 169. COOL SHOES, BALLROOM PERFORMANCE (MEN/WOMEN) (1). Focus on advanced steps and styling. A dance suite is choreographed each term. Two to three performances each term. This course is repeatable for a maximum of 11 credits. **PREREQS:** Departmental approval by audition required.

PAC 170. DANCE: WEST COAST SWING II (MEN/WOMEN) (1). Intermediate patterns, syncopations, play techniques, and styling with a focus on musical interpretation; development of leading and following. This course is repeatable for a maximum of 11 credits. **PREREQS:** PAC 165

PAC 174. FLAG FOOTBALL (1). Skill instruction and practice; drills; strategies, game play of America football; emphasis on teamwork and sportsmanship in a competitive but non-threatening or stressful environment. This course is repeatable for a maximum of 11 credits.

PAC 178. FLY FISHING I (1). Casting and fishing techniques, lure making, equipment selection, terminology, and regulation for fishing in Oregon's

marine environment. This course is repeatable for a maximum of 11 credits.

PAC 179. FLY FISHING II (1). Advanced fly casting and fly fishing techniques for trout, fly-tying, equipment selection, basic aquatic organism identification, terminology, and regulations for fishing in Oregon's freshwater environment. This course is repeatable for a maximum of 11 credits.

PAC 180. STEELHEAD FISHING (1). Casting and fishing techniques, lure making, equipment selection, terminology, and regulations for fishing in Oregon's marine environment for steelhead. This course is repeatable for a maximum of 11 credits.

PAC 181. ADVANCED FLY TYING (1). Tying of artificial flies useful for trout, steelhead, and bass fishing; dubbing techniques, spinning hair, parachute hackling, and precise winging methods included. This course is repeatable for a maximum of 11 credits. **PREREQS:** Fly Fishing I or previous fly tying experience.

PAC 182. DISC GOLF I (1). Techniques for throwing discs; equipment, knowledge, etiquette, and rules associated with playing a disc golf course; experience playing practice and official disc golf courses. This course is repeatable for a maximum of 11 credits.

PAC 184. GOLF I (1). Basic fundamental principles in all phases of golf; rules, terminology, etiquette, safety and scoring. Equipment provided. This course is repeatable for a maximum of 11 credits.

PAC 185. GOLF II (1). Individual practice and course play; skill refinement as continuation of Golf I. Equipment available. Course play expected, additional fee. This course is repeatable for a maximum of 11 credits. **PREREQS:** Golf I or equivalent.

PAC 186. GOLF III (1). Advanced skills, knowledge involved in competitive play. Course play expected, additional fee. This course is repeatable for a maximum of 11 credits. **PREREQS:** Handicap below 15 or Golf II; competitive play.

PAC 187. GOLF ON TOUR (1). Area golf courses are played in a variety of competitive formats to improve on-course competitive performance; includes rules understanding and handicap procedures. This course is repeatable for a maximum of 11 credits. **PREREQS:** GOLF II/III (PAC 184/PAC 185) or instruction from an experienced coach or instructor; the ability to consistently score under 95, and the ability to keep a 4-hour pace for 18 holes. Previous competitive golf experience is preferred.

PAC 188. GYMNASTICS (1). Fundamental techniques on vault, bars, beam, and floor. This course is repeatable for a maximum of 11 credits.

PAC 189. GYMNASTICS II (1). Build upon previous gymnastics experiences or classes; floor exercise, uneven parallel bars, vault, mini-trampoline and beam apparatus are available. This course is repeatable for a maximum of 11 credits. **PREREQS:** Gymnastics I or competitive experience.

PAC 190. KARATE (1). Instruction in traditional Japanese karate basic striking and blocking techniques, kata (forms), philosophy, conditioning, and etiquette. Self-defense applications are also emphasized. This course is repeatable for a maximum of 11 credits.

PAC 192. JUDO I (1). Skill instruction in landing, throwing and grappling for this style of martial arts; etiquette for practice and competition; basic knowledge of vocabulary, rules and scoring. This course is repeatable for a maximum of 11 credits.

PAC 193. JUDO II (1). Intermediate skill instruction in landing, throwing, pins, chokes in Kodokan Judo style; principles of Seiryoku-Zenyou and Jita-Kyoei designed to help individuals become better members of society

through training body and mind; instruction for competition knowledge and skills. Judo etiquette for practice and competition expected. This course is repeatable for a maximum of 11 credits. **PREREQS:** PAC 192 or instructor approval.

PAC 194. PILATES (1). Non-impact, invigorating approach to physical conditioning and mind/body awareness; helps develop core body strength, improve posture and balance, and increase muscle endurance, tone, flexibility. This course is repeatable for a maximum of 11 credits.

PAC 195. PILATES II (1). Progression of Joseph Pilates mat exercises; emphasis on intermediate and advanced levels; application of Pilates' principles to new exercises; use of props; application of principles to daily living. This course is repeatable for a maximum of 11 credits. **PREREQS:** PAC 194, Pilates.

PAC 197. PICKLEBALL (1). Fast-paced, self-officiated net game with similarities to tennis, badminton, table tennis, and racquetball. Course covers rules, strategies, technique, preparation for play, and includes extensive active practice and play; played with two, three, or four people. This course is repeatable for a maximum of 11 credits.

PAC 199. SPECIAL TOPICS (1-3). Experimental or new classes. This course is repeatable for a maximum of 11 credits.

PAC 201. RELAXATION (1). Introduction to relaxation techniques; posture awareness, gentle stretching, source of your energy, and creative imagery to relieve stress. This course is repeatable for a maximum of 11 credits.

PAC 205. ROWING, CREW I (MEN/WOMEN) (1). Introduction to the sport of rowing; designed for the novice (beginner). Includes basic technique and terminology, related water safety, and development of strength, endurance, and flexibility. This course is repeatable for a maximum of 11 credits. **PREREQS:** Swim Test (1).

PAC 209. ROCK CLIMBING, CONDITIONING I (1). Physical conditioning for, and instruction in, the skills and techniques of rock climbing; environmental impact issues; held at on-campus indoor climbing center. This course is repeatable for a maximum of 11 credits.

PAC 210. ROCK CLIMBING, CONDITIONING II (1). Advanced technical skills, training techniques, rescue rigging, anchor and belay systems, basic aid climbing, hauling, and other big wall techniques; three-stage training; practice. Held at on-campus climbing center. Additional fee may be required for off-campus practice. This course is repeatable for a maximum of 11 credits. **PREREQS:** Rock Climbing and Conditioning I or instructor approval.

PAC 212. RUNNING, JOGGING (1). Cardiorespiratory fitness with scenic running routes; training, nutrition, and physiology. Beginning and intermediate level. This course is repeatable for a maximum of 11 credits.

PAC 213. RUNNING: 10K TRAINING (1). Intermediate to advanced conditioning and training program for road racing. This course is repeatable for a maximum of 11 credits. **PREREQS:** Prior training in running.

PAC 214. HALF MARATHON TRAINING (2). Progressive training combining walking, running, core strengthening, interval techniques in preparation for a 13.1 mile (1/2 marathon) event. Open to all levels; may choose to walk, walk/run, or run. This course is repeatable for a maximum of 11 credits.

PAC 215. RUGBY, TOUCH (1). Basic skills of open field rugby; emphasis on ball handling and attacking strategy; rules and history; game play. This course is repeatable for a maximum of 11 credits.

PAC 217. SELF-DEFENSE (1). Nonviolent self-defense. Develop self-confidence and skills for assault situations. Conditioning and practical

skills. Men and women, all levels. This course is repeatable for a maximum of 11 credits.

PAC 224. TELEMAR SKIING (1). Winter sport that is a cross between cross country and downhill skiing. Requires telemark equipment where the heel is unattached. Class accommodates all levels and practices on the downhill slopes. Additional fee covers bus transportation, lessons, and lift ticket. Rental of equipment is not included. This course is repeatable for a maximum of 11 credits.

PAC 225. DOWNHILL SKIING (1). Travel to area facilities, 1-1/2 hour lesson followed by open practice, students grouped according to skill level: beginner, intermediate, advanced, racer. Special fee covers bus transportation, lessons, and lifts. Additional fee for rentals. This course is repeatable for a maximum of 11 credits.

PAC 227. SNOWBOARDING (1). Travel to area facilities, 1 1/2 hour lesson followed by open practice, students grouped according to skill level: beginner, intermediate, advanced. Special fee covers bus transportation, lessons, and lifts. Additional fee for rentals. This course is repeatable for a maximum of 11 credits.

PAC 229. SOCCER I (1). Basic skills of controlling the ball; conditioning; lead-up games; team play. This course is repeatable for a maximum of 11 credits.

PAC 230. SOCCER II (1). Review of basic skills of offense and defense in controlled game play; concepts of team position and play, pressure and attack. This course is repeatable for a maximum of 11 credits. **PREREQS:** Previous soccer experience.

PAC 231. SOCCER III (1). High level soccer skills; team play and transition concepts; set plays and alignments for both offense and defense. This course is repeatable for a maximum of 11 credits. **PREREQS:** Soccer II or competitive playing experience.

PAC 233. SOCCER: INDOOR (1). Skill instruction and development; strategies and rules for indoor play; game play in indoor gymnasium. This course is repeatable for a maximum of 11 credits. **PREREQS:** Previous soccer experience.

PAC 236. SOFTBALL, WHIFFLEBALL (1). Skills, rules, strategies, practice, and game play of the popular outdoor slow pitch game. Modified softball with whiffleball when play is indoors. This course is repeatable for a maximum of 11 credits.

PAC 242. SCUBA: OPEN WATER (2). Lecture includes physiology, water environment, equipment, and techniques for fundamental SCUBA diving. Laboratory includes practice in techniques, skills, and equipment usage; sessions held in pool and open water. Successful completion leads to PADI certification. Additional fee covers most equipment, texts, certification, and open water dive trip. This course is repeatable for a maximum of 11 credits. **PREREQS:** Mandatory 200-yard swim, 10-minute survival skills and good health.

PAC 243. SCUBA: ADVANCED OPEN WATER (1). Classroom lecture and laboratory in hypothermics, natural navigation, dive physiology, compass navigation, night and limited visibility procedures, boat diving, search and salvage techniques, deep diving procedures, health for diving, and an introduction to dive rescue. Successful completion of this course can lead to PADI certification. Additional fee. This course is repeatable for a maximum of 11 credits. **PREREQS:** PAC 242

PAC 244. SCUBA: RESCUE DIVER (1). Techniques, skills, knowledge, and practice in self-rescue and rescue of others in underwater emergencies; may lead to PADI certification; lecture and pool laboratory; open water dive required. Additional fee. This course is repeatable for a maximum of 11 credits. **PREREQS:** PAC 243 or equivalent.

PAC 245. SCUBA SPECIAL TOPICS (1).

Specialized courses requiring previous certification in SCUBA. Check the current schedule of classes for more information and prerequisites. Possible classes: altitude diver, night diver, search and recovery, deep diver, underwater navigation, equipment specialist. Additional fee. This course is repeatable for a maximum of 11 credits. **PREREQS:** PAC 242

PAC 246. DIVEMASTER TRAINING (2).

Entry level PADI certification course for preparation to instruct SCUBA; lecture, lab, open water experience; must take two consecutive terms. Additional fee: \$160 per term. This course is repeatable for a maximum of 11 credits. **PREREQS:** PAC 244. PADI Advanced, Advanced Plus, and Rescue Diver certifications or equivalent; 20 logged dives.

PAC 247. SURFING (1).

Knowledge and fundamental skills of this aquatic sport including history, terminology, safety precautions, the ocean environment, and equipment. Additional fee. This course is repeatable for a maximum of 11 credits. **PREREQS:** Equivalent to Swim I (PAC 250). Students must pass a swim test in the pool before going into the ocean.

PAC 248. SWIM: NON-SWIMMER (1).

Skills for self-rescue; fundamental skills in swimming and safety. Designed for people with a fear of water. Recommended S/U grading. This course is repeatable for a maximum of 11 credits.

PAC 250. SWIM I (1).

Swimming concepts, survival and breathing techniques, front crawl and elementary backstroke as minimum instruction. This course is repeatable for a maximum of 11 credits. **PREREQS:** Minimal swimming skill.

PAC 251. LAP SWIM, STROKE ASSISTANCE (1).

Noncompetitive swim, exercise program with individual stroke skill assistance. This course is repeatable for a maximum of 11 credits.

PAC 252. SWIM II (1).

Fitness swimming, swimming strokes and skills. This course is repeatable for a maximum of 11 credits. **PREREQS:** 75 yd. front crawl. Swim I skills.

PAC 253. SWIM TRAINING WORKOUT (1).

Competitive skills and strokes; emphasis on training. This course is repeatable for a maximum of 11 credits. **PREREQS:** Ability to do interval training.

PAC 254. COMPETITIVE SWIMMING (1).

Prepares students for competitive swimming and emphasizes lifetime aquatic fitness; interval swim workouts designed for speed and endurance; instruction on legal techniques of strokes and turns; culminates in intra-class swim meet; 2,000-3,000 yards/day. This course is repeatable for a maximum of 11 credits. **PREREQS:** 300 yd. front crawl; 50 yd. backstroke and breaststroke; ability to do interval training.

PAC 256. TAIJI, TAI CHI I (1).

Introduction to ancient Chinese 'internal martial art' based upon concepts of Yin and Yang; detailed slow and relaxed form movements provide benefits to body, mind, and spirit. This course is repeatable for a maximum of 11 credits.

PAC 257. TAIJI, TAI CHI II (1).

Continuation of study of the Yang-style Taiji form; more in-depth exploration of underlying principles and push-hands exercises. This course is repeatable for a maximum of 11 credits.

PAC 258. TAP DANCE I (1).

Basic vocabulary and steps; will emphasize proper technique and include a progression to more rhythmic combinations using a variety of music and creative styles. This course is repeatable for a maximum of 11 credits.

PAC 259. TAP DANCE II (1).

An expansion of the skills and vocabulary of Tap Dance I; progression to more advanced and longer combinations; may be opportunities to perform in a concert. This course is repeatable for a maximum of 11 credits. **PREREQS:** Tap Dance I or instructor approval.

PAC 260. TENNIS I (1). Introduction to fundamental strokes, singles and doubles play, scoring, and basic concepts in tennis. This course is repeatable for a maximum of 11 credits.

PAC 261. TENNIS II (1). Review and refinement of fundamental strokes; volley, lob, return of serve; introduction to singles and doubles strategy. This course is repeatable for a maximum of 11 credits. **PREREQS:** Tennis I or instructor approval.

PAC 262. TENNIS III (1). Focus on ground stroke, serve consistency; approach shots and overheads; tactics for net and baseline play. This course is repeatable for a maximum of 11 credits. **PREREQS:** Tennis II or instructor approval.

PAC 264. TEAM HANDBALL (MEN/WOMEN) (1).

Fast-paced indoor court game that combines skills and strategies similar to water polo, basketball, soccer and hockey; rules, regulations, strategies, and skills introduced and practiced; requires teamwork, cooperation, and court strategy. This course is repeatable for a maximum of 11 credits.

PAC 265. TUMBLING I (1). Technical instruction, progressions, and practice in basic, intermediate, and advanced tumbling skills; emphasis on safety and fitness concepts; floor and mini-trampoline skills; no apparatus instruction. This course is repeatable for a maximum of 11 credits.

PAC 266. TUMBLING II (1). Technical instruction, progressions, safety, and practice building upon skills taught in PAC 265, Tumbling I. This course is repeatable for a maximum of 11 credits. **PREREQS:** Tumbling I or prior experience.

PAC 268. TRIATHLON TRAINING (2). Training in swimming, running, and bicycling to prepare for triathlon participation. Strategies, transitioning technique, and weight training information; training plan formation; event planning; culminates in class or community event. This course is repeatable for a maximum of 11 credits. **PREREQS:** Experience in at least one of the three activities.

PAC 271. ULTIMATE FRISBEE I (1).

Fundamentals for the beginning and intermediate player; individual skill development, rules, game play, and strategy. This course is repeatable for a maximum of 11 credits.

PAC 273. VOLLEYBALL I (1). Fundamental volleyball skills, drills, rules, strategies, and practice. Game play appropriate for skill level. This course is repeatable for a maximum of 11 credits.

PAC 274. VOLLEYBALL II (1). Fundamental skills and knowledge refined; intermediate skills developed, competitive play. This course is repeatable for a maximum of 11 credits. **PREREQS:** Volleyball I and good fundamental skills.

PAC 275. VOLLEYBALL III (1). Skill refinement and development; intense, highly competitive drills and game situations, doubles through sixes play. This course is repeatable for a maximum of 11 credits. **PREREQS:** Volleyball II and instructor's approval or varsity-level experience.

PAC 278. FITNESS WALKING (1). Establishment of personal fitness programs through walking with emphasis on technique and aerobic components. This course is repeatable for a maximum of 11 credits.

PAC 282. WATER POLO (1). Team game, played in deep water; instruction in skills, drills, strategies, techniques; game play; knowledge of rules and terminology. This course is repeatable for a maximum of 11 credits. **PREREQS:** Swim I skills.

PAC 286. WEIGHT TRAINING: CIRCUITS (1).

Fast-paced fitness class using stations of resistance training exercises. Designed to improve cardiovascular fitness and muscular endurance more than strength. This course is repeatable for a maximum of 11 credits.

PAC 287. WEIGHT TRAINING I (1).

Exercise techniques in both free and fixed resistance training equipment; safety procedures,

terminology, and principles of exercise. This course is repeatable for a maximum of 11 credits.

PAC 288. WEIGHT TRAINING II (1). Intermediate level of weight training in free and fixed weights. This course is repeatable for a maximum of 11 credits. **PREREQS:** Weight Training I.

PAC 292. WRESTLING (1). Collegiate wrestling fall and winter terms; freestyle and Greco wrestling spring term. All levels. This course is repeatable for a maximum of 11 credits.

PAC 294. YOGA I (1). Principles and practice of basic yoga postures, techniques of posture alignment, yogi breathing styles and their impact on the body and mind. This course is repeatable for a maximum of 11 credits.

PAC 295. YOGA II (1). Intermediate level course to improve yoga practice and to develop overall deeper understanding of yoga methodology in more advanced posture. This course is repeatable for a maximum of 11 credits. **PREREQS:** Yoga I or previous yoga experience.

PAC 296. FITNESS YOGA (1). Dynamic sequence of movements and sustained yoga positions; regulated breathing; encourages systematic discipline and approach to life. Open to beginners. This course is repeatable for a maximum of 11 credits.

PAC 297. YOGATHON (1). Expands on knowledge and skills learned in Yoga I or Fitness Yoga through three to five class sessions, each 3-6 hours; longer sessions provide students with an intensive mental and physical experience centering on the concepts of yoga; includes introductory relaxation and meditation skills. This course is repeatable for a maximum of 11 credits. **PREREQS:** Yoga I or Fitness Yoga highly recommended. PAC 294 and PAC 295 and PAC 296

PAC 299. SPECIAL TOPICS (1-3). Advanced information, skills, practice, and application; experimental and new classes. May have additional fee. This course is repeatable for a maximum of 11 credits. **PREREQS:** Intermediate to advanced skills in an activity area or instructor approval required.

PAC 301. ALI: CHALLENGE COURSE

EXPERIENCE (1). Emphasis on gaining practical experience and understanding of various components that occur in challenge course activities/programs; group dynamic mental and physical challenges; cooperative games and initiatives that promote communication, problem solving skills and leadership; Low and High challenge course activities that promote self confidence and agility. This course is repeatable for a maximum of 11 credits.

PAC 304. ALI: BACKPACKING (1). Hiking and camping while carrying all gear; tent set-up, camp site selection, operation of single-burner stoves, loading a backpack, water infiltration, navigation, proper hiking technique, energy conservation; leave-no-trace principles in every aspect of the trip and class; includes classroom instruction and required overnight trip. This course is repeatable for a maximum of 11 credits.

PAC 314. ALI: BOULDERING (1). Introduction to the sport of bouldering, a subset of rock climbing using an indoor climbing facility; emphasis on safety, spotting, climbing movement, training techniques and improvement; provides activities that promote muscular strength and endurance, flexibility, and cardiovascular endurance. This course is repeatable for a maximum of 11 credits.

PAC 315. ALI: ROCK CLIMBING I (1). Physical conditioning for, and instruction in, the skills and techniques of rock climbing; environmental impact issues; held at on-campus indoor climbing center. This course is repeatable for a maximum of 11 credits. This course is repeatable for a maximum of 11 credits.

PAC 316. ALI: ROCK CLIMBING II (1). Advanced technical skills, training techniques, rescue rigging, anchor and belay systems, basic aid

climbing, hauling, and other big wall techniques; three-stage training; practice. Held at on-campus climbing center. Additional fee may be required for off-campus practice. This course is repeatable for a maximum of 11 credits. **PREREQS:** PAC 315

PAC 320. ALI: MOUNTAINEERING I (1). Snow climbing techniques, anchoring, belaying and rappelling techniques, snow camping/living skills, and wilderness ethics; classroom instruction and required overnight alpine trip. This course is repeatable for a maximum of 11 credits.

PAC 321. ALI: MOUNTAINEERING II (1). Building on skills learned in Mountaineering I; rope team/glacier travel experience, fundamentals of crevasse rescue, advanced snow climbing techniques, safe anchoring, belaying and rappelling techniques, snow camping/living skills, and wilderness ethics. This course is repeatable for a maximum of 11 credits. **PREREQS:** PAC 320

PAC 325. ALI: WILDERNESS FIRST AID (1). Fundamentals of emergency care in a non-urban environment including anatomy, physiology, injury assessment, short-term care, small-group rescues; backcountry emphasis with long-term care and evacuation complications. This course is repeatable for a maximum of 11 credits.

PAC 329. ALI: WILDERNESS FIRST RESPONDER (2). Fundamentals of emergency care in a non-urban environment, including physiology, injury assessment, short-term care, anatomy, and small-group rescues. This course is repeatable for a maximum of 11 credits. **PREREQS:** CPR certification.

SCHOOL OF SOCIAL AND BEHAVIORAL HEALTH SCIENCES

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FACULTY

Professors Acock, Aldwin, Arnold, Bourdeau, Bowman, Braverman, Catania, Dawson, Driscoll, Flay, Galloway, Harvey, Hooker, Hosty, Kershaw, Rennekamp, Settersten, Thorburn

Associate Professors Ashton, Bernell, Black, Busler, Cowan, Dolcini, Hart, Jones, Knutz, Lesmeister, Luck, MacTavish, Magaña, Manlove, McClelland, Nagele, Rose, Schreiber, Smith, Stawski, Vuchinich, Wells, White, Withee

Assistant Professors Ahluwalia, Baggott, Brody, Davis, Geldhof, Green, Hatfield, Lipscomb (Cascades Campus), Mendez-Luck, L. Richards, Warren, Willis, Yoon

Clinical Associate Professor Volmar

Postdoctoral Fellows Stokes

Senior Instructors Brey (Cascades Campus), Greaves, Hein, Osterland, Roll, Sorte

Instructors Crawford, Daeschel, Elliott, Ferris, Fonseca, Hedgcoth, Johnson, Keller, Kraemer, Livesay, Lynn (Cascades Campus), Mannering, Martinez-Alvarez, Maxwell, McDonnell, McGraw, McKenna, O'Rourke, Seifert, Vawter, Williams

Research Associates Levenson, Grobe, Weber

Research Assistants Branch, Jeong, Lewis

ADJUNCT FACULTY

Edwards, Gallagher, Gunter, Lee, Rodrigues, Sherman, Warner

Undergraduate Majors

Human Development and Family Sciences (BS, CRED, HBS)

Options
Child Development

Human Development and Family Sciences, General

Human Services

Public Health (BS, CRED, HBS)

Options

Health Management and Policy

Health Promotion and Health Behavior

Undergraduate Minors

Early Childhood Development and Education (OSU-Cascades only)

Health Management and Policy

Public Health

Undergraduate Certificate Program

Gerontology Certificate

Graduate Majors

Human Development and Family Studies (MAIS, MS, PhD)

Graduate Areas of Concentration

Human Development and Family Studies

Public Health (MPH, PhD)

Graduate Areas of Concentration

Biostatistics (MPH only)

Environmental and Occupational Health and Safety (MPH, PhD)

Epidemiology (MPH only)

Health Management and Policy (MPH only)

Health Policy (PhD only)

Health Promotion and Health Behavior (MPH, PhD)

International Health (MPH only)

Graduate Minors

Aging Sciences

Community Health

Graduate Area of Concentration

Community Health

Gerontology

Human Development and Family Studies

Affiliated Interdisciplinary

Graduate Majors

Applied Economics (MA, MS, PhD)

(See Graduate School)

Rural Studies (Graduate Minor)

(See Graduate School)

Graduate Certificates

Graduate Certificate in Public Health Health Management and Policy

The School of Social and Behavioral Health Sciences comprises the fields of health management and policy, health promotion and health behavior, and human development and family sciences. These disciplinary approaches use social and behavioral sciences to improve understanding of the factors that influence the health and well-being of individuals, families, and communities. In addition, these fields develop sound policy, programs, and interventions to improve health and well-being at multiple

levels. Finally, through our curricula, we develop the next generation of globally minded public health and human sciences professionals.

The School of Social and Behavioral Health Sciences houses the undergraduate degrees of Human Development and Family Sciences and Public Health. The majors and their options are described below.

The school also houses the MS and PhD in Human Development and Family Studies (see <http://health.oregonstate.edu/degrees/graduate/hdfs.>)

The school houses the following tracks of the Master of Public Health (MPH): health management and policy, and health promotion and health behavior. For more information about the MPH program and its areas of concentration, see <http://health.oregonstate.edu/degrees/graduate/public-health/mph.>

The school also houses the following concentrations of the Public Health doctoral program: health policy, and health promotion and health behavior, see <http://health.oregonstate.edu/degrees/graduate/public-health/phd-program.>

UNDERGRADUATE PROGRAMS

HUMAN DEVELOPMENT AND FAMILY SCIENCES MAJOR

The field of human development and family sciences (HDFS) applies an interdisciplinary perspective to understand the development of individuals across the life course and their diverse family, school, and community environments. Students who major in HDFS have diverse and exciting career options in schools and in the helping professions, or can pursue advanced academic study in HDFS or related areas.

The School of Social and Behavioral Health Sciences offers a BS in Human Development and Family Sciences with three options:

- Child Development
- Human Development and Family Sciences, General
- Human Services

All three options provide students with the prerequisites for graduate programs in human development and family sciences.

FAMILY AND CONSUMER SCIENCES TEACHER TRAINING

Students desiring a license to teach family and consumer sciences (grades 5 through 12) should contact PHHS Advising, <http://health.oregonstate.edu/students/current/undergraduate/advising>

PUBLIC HEALTH MAJOR

Public health is an exciting and diverse field for those interested in the health and well-being of populations and their environments. Careers in the public

and private sectors offer opportunities to work locally, regionally, nationally, and internationally to promote health and prevent disease. Recognizing that multiple and complex factors affect the public's health, our faculty and students examine environmental issues, access to health care services, health policies, and social and contextual factors as determinants of health.

Students in this major will choose one of the following major options:

- Health Management and Policy
- Health Promotion and Health Behavior

Both options provide students with the prerequisites for graduate programs in public health.

HEALTH MANAGEMENT AND POLICY OPTION

This option provides training and skills in the management of public health, health care programs and agencies, and in the analysis of public health policies. The program is appropriate for those who want to manage health programs in a wide range of institutions, both public and private, and is particularly well-suited for students interested in the business aspects associated with the delivery and financing of health services. Students can also receive a certificate of Gerontology.

HEALTH PROMOTION AND HEALTH BEHAVIOR OPTION

This option prepares students for many career opportunities in the areas of public health promotion, health behavior, and disease prevention. Students learn a variety of skills and strategies that will provide them with the necessary proficiencies to improve population health in diverse settings. The program focuses on the social and behavioral determinants of health and disease across the lifespan, with a particular emphasis on health disparities. Graduates are qualified to assist with the planning, implementing, and evaluation of programs that address health disparities and that are intended to improve the health of diverse populations.

UNDERGRADUATE MAJORS WITH OPTIONS

HUMAN DEVELOPMENT AND FAMILY SCIENCES (BS, CRED, HBS)

HDFS majors study interdisciplinary research and theory on human development across the lifespan within the contexts of families, school, work, and communities to prepare for careers in schools and helping professions, and to pursue advanced academic degrees. The BS in Human Development and Family Sciences can be pursued through one of three options listed below:

1. Child Development option

2. Human Development and Family Sciences, General
3. Human Services option

See each option in the HDFS overview for detailed information.

Note: It is possible to choose more than one option. Students should meet with an advisor in the college's Academic Advising Office in Milam Hall 116 for additional information.

Credits Needed to Graduate:

180 credits, 60 of which must be upper division. Credits are to include baccalaureate core courses, HDFS core courses, classes required for each option, and electives.

Baccalaureate Core (48)

48 credits required of all students; courses may include BCC courses in the HDFS core and options as indicated by an asterisk.

HDFS Core Courses (40-46)

Required of all HDFS students:

- COMM 218. *Interpersonal Communication (3)
 H 100. Introduction to Public Health (4)
 HDFS 240. *Human Sexuality (3)
 HDFS 314. Adult Development and Aging (4)
 HDFS 341. Family Studies (4)
 HDFS 360. Critical Thinking in Human Development and Family Sciences (4)
 HDFS 361. Applied Research Methods (4)
 NUTR 225. General Human Nutrition (3)
 PSY 201. *General Psychology (3)
 PSY 202. *General Psychology (3)
 SOC 204. *Introduction to Sociology (3)
 WR 327. *Technical Writing (3)

Choose one of three statistics options below:

1. H 220. Introduction to Health Data Analysis (3)
2. ST 201, ST 202. Principles of Statistics (4,4)
3. ST 351. Introduction to Statistical Methods (4)

OPTIONS

CHILD DEVELOPMENT OPTION

The Child Development option prepares students to work directly with children of all ages and their families. This option is a strong foundation for work in preschool and Head Start classrooms, early intervention, adolescent intervention, parent education and support, or for graduate work in HDFS, psychology, sociology, or education. With additional course work, students can pursue teacher licensure through the OSU College of Education or through other institutions.

HDFS Core

- HDFS 240. *Human Sexuality (3)
 HDFS 314. Adult Development and Aging (4)
 HDFS 341. Family Studies (4)
 HDFS 360. Critical Thinking in Human Development and Family Sciences (4)
 HDFS 361. Applied Research Methods (4)

Non-HDFS Courses

- COMM 218. *Interpersonal Communication (3)

NUTR 225. General Human Nutrition (3)
 PSY 201. *General Psychology (3)
 PSY 202. *General Psychology (3)
 SOC 204. *Introduction to Sociology (3)
 WR 327. *Technical Writing (3)

Choose one of three statistics options below:

H 220. Introduction to Health Data Analysis (3)
 ST 201, ST 202. Principles of Statistics (4,4)
 ST 351. Introduction to Statistical Methods (4)

Child Development Curriculum (36–39)

HDFS 311 Infant and Child Development (4)
 HDFS 313 Adolescent Development (4)
 HDFS 330. Fostering Learning in Early Childhood Development (4)
 HDFS 430. ^Student Teaching in Early Childhood Development and Education (12)
 HDFS 431. Family, School, and Community Collaboration (3)

Choose any three (9–12):

ED 140. Introduction to Early Childhood Education (4) **Central Oregon Community College Only**
 HDFS 201. *Contemporary Families in the U.S. (3)
 HDFS 312. Parenting Research and Application (4)
 HDFS 331. Directed Experience in Early Childhood (3) **Cascades Only**
 HDFS 431. Family, School, and Community Collaboration (3)
 HDFS 432. Children and Youth With Special Needs (3)
 HDFS 444. Family Violence and Neglect (4)
 HDFS 447. *Families and Poverty (4)
 HDFS 465. Topics in Human Development and Family Sciences (3)

HUMAN DEVELOPMENT AND FAMILY SCIENCE, GENERAL OPTION

Students majoring in Human Development and Family Sciences learn how people change across the life course within the contexts of families, school, work, and communities. Information from many disciplines is applied to the study of individuals and families, preparing students to fully understand people and to develop skills in critical thinking and in research. Students learn about infants and toddlers, teens and adults of all ages, and families.

On completing the HDFS General option, students are prepared to be involved and effective community members and to improve people's lives. The HDFS General option is ideal for students interested in the helping professions and also pairs well with a minor or a second major in liberal studies; pre-medicine or pre-nursing; psychology; public health; sociology; Spanish; or women studies, gender, and sexuality studies. It provides exceptional preparation for graduate work in counseling, education, public policy, social work, or human development and family sci-

ences, each of which can lead to a productive, satisfying career.

HDFS Core

HDFS 240. *Human Sexuality (3)
 HDFS 314. Adult Development and Aging (4)
 HDFS 341. Family Studies (4)
 HDFS 360. Critical Thinking in Human Development and Family Sciences (4)
 HDFS 361. Applied Research Methods (4)

Non-HDFS Courses

COMM 218. *Interpersonal Communication (3)
 NUTR 225. General Human Nutrition (3)
 PSY 201. *General Psychology (3)
 PSY 202. *General Psychology (3)
 SOC 204. *Introduction to Sociology (3)
 WR 327. *Technical Writing (3)

Choose one of three statistics options below:

H 220. Introduction to Health Data Analysis (3)
 ST 201, ST 202. Principles of Statistics (4,4)
 ST 351. Introduction to Statistical Methods (4)

Required for Option (12)

HDFS 311. Infant and Child Development (4)
 HDFS 313. Adolescent Development (4)
 HDFS 461. ^Program Development and Proposal Writing (4)

Choose at least 11 credits from the following courses not previously taken:

ED 140. Introduction to Early Childhood Education (4) **COCC Course**
 HDFS 201. *Contemporary Families in the U.S. (3)
 HDFS 312. Parenting Research and Application (4)
 HDFS 331. Directed Experience in Early Childhood (3) **Cascades Only**
 HDFS 431. Family, School, and Community Collaboration (3)
 HDFS 432. Children and Youth With Special Needs (3)
 HDFS 444. Family Violence and Neglect (4)
 HDFS 447. *Families and Poverty (4)
 HDFS 465. Topics in Human Development and Family Sciences (3)

HUMAN SERVICES OPTION

The Human Services option prepares students for entry-level positions in a variety of human services settings including the juvenile justice system, health care settings and hospices, criminal justice agencies, community advocacy groups, the child welfare system, elderly services, children and youth services, substance abuse programs, and many others. Students gain an understanding of the social and human service delivery systems and acquire basic skills to communicate effectively with clients, develop intervention strategies, and solve interpersonal and social problems. At least two internship experiences in human services programs are required for degree completion. Students are prepared to pursue a graduate degree in several areas including counseling, social work, psychology, marriage and family therapy, human development

and family sciences, nonprofit administration, public policy, and others.

HDFS Core

HDFS 240. *Human Sexuality (3)
 HDFS 314. Adult Development and Aging (4)
 HDFS 341. Family Studies (4)
 HDFS 360. Critical Thinking in Human Development and Family Sciences (4)
 HDFS 361. Applied Research Methods (4)

Non-HDFS Courses

COMM 218. *Interpersonal Communication (3)
 NUTR 225. General Human Nutrition (3)
 PSY 201. *General Psychology (3)
 PSY 202. *General Psychology (3)
 SOC 204. *Introduction to Sociology (3)
 WR 327. *Technical Writing (3)

Choose one of three statistics options below:

H 220. Introduction to Health Data Analysis (3)
 ST 201, ST 202. Principles of Statistics (4,4)
 ST 351. Introduction to Statistical Methods (4)

Human Services (36–47)

HDFS 107 Internship Orientation (1)
 HDFS 209. Introductory Internship (4) (*may be repeated for a max. of 8 credits*)
 HDFS 311. Infant and Child Development (4) or HDFS 313. Adolescent Development (4)
 HDFS 410. Advanced Internship (10)
 HDFS 461. ^Program Development and Proposal Writing (4)
 HDFS 462. Skills for Human Services Professionals (4)

Choose any three:

ED 140. Introduction to Early Childhood Education (4) **COCC Only**
 HDFS 201. *Contemporary Families in the U.S. (3)
 HDFS 311. Infant and Child Development (4)
 HDFS 312. Parenting Research and Application (4)
 HDFS 313. Adolescent Development (4)
 HDFS 331. Directed Experience in Early Childhood (3) **Cascades Only**
 HDFS 431. Family, School, and Community Collaboration (3)
 HDFS 432. Children and Youth With Special Needs (3)
 HDFS 444. Family Violence and Neglect (4)
 HDFS 447. *Families and Poverty (4)
 HDFS 465. Topics in Human Development and Family Sciences (3)

PUBLIC HEALTH (BS, CRED, HBS)

Public Health majors are required to complete the Public Health core and one of two options in order to earn the BS in Public Health degree:

- Health Management and Policy
- Health Promotion and Health Behavior

Before admission to the Public Health major, the student must complete the Public Health pre-major (major code 738), which requires a minimum average GPA of 3.0 in the following four courses. Additionally, a minimum grade of C is required in each.

H 100. Introduction to Public Health (4)
 H 210. *Introduction to the Health Care System (3)
 H 220. Introduction to Health Data Analysis (3)
 or ST 201. Principles of Statistics (4)
 H 225. *Social and Individual Health Determinants (4)

Public Health Core (Both Options)

H 100. Introduction to Public Health (4)
 H 210. *Introduction to the Health Care System (3)
 H 220. Introduction to Health Data Analysis (3)
 or ST 201. Introduction to Statistics (4)
 H 225. *Social and Individual Health Determinants (4)
 H 319. Introduction to Health Policy (3)
 H 320. Introduction to Human Disease (3)
 H 344. Foundations of Environmental Health (3)
 H 425. Foundations of Epidemiology (3)

OPTIONS

HEALTH MANAGEMENT AND POLICY OPTION

This option provides training and skills in the management of public health and health care programs and agencies, and in the analysis of public health policies. The program is appropriate for those who want to manage health programs in a wide range of institutions, both public and private and is particularly well-suited for students interested in the business aspects associated with the delivery and financing of health services. Students can also focus on administration in assisted living facilities, continuing care retirement centers and nursing homes and receive a Certificate in Gerontology.

Health Management and Policy Required Track Core (21)

H 250. Introduction to Health Care Management (3)
 H 431. Health Care Marketing (3)
 H 432. Economic Issues in Health and Medical Care (3)
 H 434. ^Health Care Law and Regulation (3)
 H 436. Health Services Administration and Management (3)
 H 457. Financial Management of Health Care Organizations (3)
 H 458. Reimbursement Mechanisms (3)

Required Internship (13)

H 407. Seminar (Sect. 1, Pre-Internship) (1)
 H 410. Internship (12)

Required Supporting Courses (36)

BA 215. Fundamentals of Accounting (4)
 BA 351. Managing Organizations (4)
 BA/MGMT 453. Human Resources Management (4)
 CS 101. Computers: Applications and Implications (4)
 ECON 201. *Introduction to Microeconomics (4)
 ECON 202. *Introduction to Macroeconomics (4)
 MB 230. *Introductory Microbiology (4)

MTH 245. *Mathematics for Management, Life, and Social Sciences (4)
 PHL 444. *Biomedical Ethics (4)

Footnotes:

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

HEALTH PROMOTION AND HEALTH BEHAVIOR OPTION

This option prepares students for many career opportunities in the areas of public health promotion, health behavior, and disease prevention. Students learn a variety of skills and strategies that will provide them with the necessary proficiencies to improve population health in diverse settings. The program focuses on the social and behavioral determinants of health and disease across the lifespan, with a particular emphasis on health disparities. Graduates are qualified to assist with the planning, implementing, and evaluation of programs that address health disparities and that are intended to improve the health of diverse populations.

Health Promotion and Behavior Required Track Core (21)

H 310. Health Field Experiences: Peer Helper (3)
 or H 349. Peer Helper Skills Development (3)
 H 407. Seminar (Sect. 1, Pre-Internship) (2)
 H 410. Internship (12)
 H 476. ^Planning and Evaluating Health Promotion Programs (4)

Required Supporting Courses (16)

BI 101. *General Biology (4)
 or BI 102. *General Biology (4)
 or BI 103. *General Biology (4)
 ES 101. *Introduction to Ethnic Studies (3)
 NUTR 225. General Human Nutrition (3)
 or NUTR 240. Human Nutrition (3)
 PSY 201. *General Psychology (3)
 SOC 204. *Introduction to Sociology (3)

Footnotes:

* Baccalaureate Core Course
 ^ Writing Intensive Course (WIC)

UNDERGRADUATE MINORS

EARLY CHILDHOOD DEVELOPMENT AND EDUCATION MINOR

For Non-HDFS Majors at OSU-Cascades Campus only.

Required Course Work

HDFS 311. Infant and Child Development (4)
 HDFS 330. Fostering Learning in Early Childhood Development (4) *At OSU-Cascades*
 HDFS 331. Directed Experience in Early Childhood (3) *At OSU-Cascades*
 HDFS 341. Family Studies (4) *At OSU-Cascades*
 HDFS 431. Family, School, and Community Collaboration (3) *At OSU-Cascades*
 PSY 201. Mind and Brain (3) *Provided by COCC*

PSY 202. Mind and Society (3) *Provided by COCC*

Plus 6 credit of upper-division electives with HDFS prefix.

Total=27, including 18 credits of upper-division credits in HDFS

Footnote:

^ Writing Intensive Course, WIC

HEALTH MANAGEMENT AND POLICY MINOR

The Health Management and Policy minor provides students with a background in public health with an emphasis on the management of health care programs and agencies.

ECON 201. *Introduction to Microeconomics (4)

H 100. Introduction to Public Health (4)
 H 210. *Introduction to the Health Care System (3)

H 220. Introduction to Health Data Analysis (3) *(not required for business majors)*

H 225. *Social and Individual Health Determinants (4)

H 250. Introduction to Health Care Management (3)

H 436. Advanced Topics in Health Care Management (3)

Check prerequisites/corequisites for H 250 and H 436.

Select 9 credits from the following (business majors select 12 credits):

H 425. Foundations of Epidemiology (3)
 H 431. Health Care Marketing (3)
 H 432. Economic Issues in Health and Medical Care (3)
 H 434. ^Health Care Law and Regulation (3)
 H 457. Financial Management of Health Care Organizations (3)
 H 458. Reimbursement Mechanisms (3)
 H 468. Financing and Administration of Long-Term Care (3)

PUBLIC HEALTH MINOR

The Public Health minor provides students with a general background in public health. Students with this minor may not take any of the required courses listed below with S/U grading, including the "any other H course" requirement. Students may, however, take additional public health courses not required for the minor with S/U grading.

H 100. Introduction to Public Health (4)
 H 210. *Introduction to the Health Care System (3)

H 220. Introduction to Health Data Analysis (3)
 or ST 201. Principles of Statistics (4)

H 225. *Social and Individual Health Determinants (4)

H 319. Introduction to Health Policy (3)

H 320. Introduction to Human Disease (3)

H 344. Foundations of Environmental Health (3)

H 425. Foundations of Epidemiology (3)

Any other H course of at least 3 credits

Total = 29 credits

HUMAN DEVELOPMENT AND FAMILY STUDIES (MS, PhD, MAIS)

Graduate Areas of Concentration *Human development and family studies*

The School of Social and Behavioral Health Sciences offers course work and programs of study in the area of human development and family studies. The Gerontology Program is also administered by the College of Public Health and Human Sciences through the school. Areas of study and degrees granted are described below.

Human development and family studies offers graduate work leading to master of science and doctor of philosophy degrees. Graduate programs take a multidisciplinary approach, preparing students for college and university teaching and research, as well as development, administration, and evaluation of programs serving individuals and families across the lifespan.

Our research is interdisciplinary with signature themes in (a) transitions across the life course, (b) risk and resilience across the life span, and (c) developmental and family research methods. Our faculty recognize the critical importance of culture and gender, diversity, and contemporary global perspectives in the discovery of knowledge. We have research emphases in child development, adolescence, adult development and aging, families, rural communities, and cross-national comparison.

Research is an important focus of the Graduate Program in Human Development and Family Studies. The HDFS faculty includes nationally recognized scholars who are widely published in areas such as families and aging; family communication and conflict; child, adolescent, and adult development; intergenerational family relationships; family structure; and gender. We emphasize both quantitative and qualitative methodology.

For more information, contact the Graduate Program in Human Development and Family Studies, College of Public Health and Human Sciences, 437 Waldo Hall, OSU, Corvallis, OR 97331-5102.

PUBLIC HEALTH (MPH, PhD)

Graduate Areas of Concentration *Biostatistics (MPH only); environmental and occupational health and safety (MPH, PhD); epidemiology (MPH only); health management and policy (MPH only); health policy (PhD only); health promotion and health behavior (MPH, PhD); international health (MPH only)*

The PhD and MPH in public health degree programs are summarized below.

For further information about public health graduate programs, contact 541-737-3825 or visit the Public Health major

website at <http://health.oregonstate.edu/degrees/graduate/public-health>.

Doctor of Philosophy (PhD) in Public Health

The PhD in Public Health is for individuals who wish to prepare themselves for careers in university teaching, research, consulting, policy development, or other high-level public health positions. There are currently three areas of concentration offered for the PhD degree:

1. Environmental and occupational health and safety;
2. Health policy;
3. Health promotion and health behavior.

A master's degree in a relevant field is required before admission into the PhD program.

The PhD program consists of a minimum of 109 credits, including at least 36 graduate credits devoted to preparation of the thesis. Doctoral students take courses in research and quantitative methods, theory, ethics, and their area of emphasis. Each student and his or her doctoral committee jointly determine the student's specific program of doctoral study. This process allows students to design a course of study uniquely suited to their particular needs and career goals. Further information about these requirements is available in the PhD in Public Health website and PhD handbook at <http://health.oregonstate.edu/degrees/graduate/public-health/phd-program>.

Master of Public Health (MPH)

The Oregon Master of Public Health (OMPH) program is a joint graduate program offered by Oregon State University (OSU), Oregon Health and Sciences University (OHSU), and Portland State University (PSU). Oregon State University offers six tracks in the OMPH Program:

1. Biostatistics Track
2. Environmental and Occupational Health and Safety Track
3. Epidemiology Track
4. Health Management and Policy Track
5. Health Promotion and Health Behavior Track
6. International Health Track

All students in the OMPH must take a common MPH core of five courses in the following areas:

- Biostatistics
- Environmental health
- Epidemiology
- Health behavior
- Health systems organization

In addition, each OMPH track has specific course requirements. The OMPH tracks offered at OSU are summarized below. The minimum number of credits varies by track.

All MPH students must do a 6-credit internship upon completion of their core and track classes. Upon completion of all required course work and the internship,

all MPH students must schedule a final oral examination. Students must receive approval to take the exam from their academic advisors. For MPH students who choose to do a thesis or project, the oral exam will be included as part of the thesis/project defense.

Further information about the OMPH program and tracks can be found at the OMPH website at <http://www.oregonmph.org/> and MPH handbooks at <http://health.oregonstate.edu/degrees/graduate/public-health/graduate-handbooks>.

GRADUATE MINORS

AGING SCIENCES GRADUATE MINOR

This graduate minor provides interdisciplinary graduate education in the aging sciences through formal course work, research requirements and experiential learning that is aligned with the student's career goals in aging.

The Aging Sciences minor requires 15 credits from the following courses.

Required Courses:

- BB 650. Selected Topics in Biochemistry and Biophysics: *Molecular Mechanisms of Aging* (3)
 CS 607/EXSS 607/HDFS 607. Seminar: *Research and Professional Topics in Aging* (1) *Taken 4 terms*
 GRAD 520. Responsible Conduct of Research (1)
 HDFS 565. Topics in Human Development and Family Sciences: *Behavioral and Social Sciences of Aging* (3)

Select 4 or more credits (1–2 courses) from the following:

Computer Science

- CS 519. Topics in Computer Science: *Data Visualization* (4)
 CS 519. Topics in Computer Science: *Human Computer Interaction* (4)

Exercise and Sport Science

- EXSS 515. Motor Control and Movement Dysfunction (3)
 EXSS 525. Biomechanics of Musculoskeletal Injury (3)
 EXSS 536. Exercise Management of Chronic Disease (3)
 EXSS 550. Health Promotion for People with Disabilities (3)
 EXSS 562. Lifespan Sport and Exercise Psychology (3)
 EXSS/NUTR 599. Special Topics: *Bone Physiology* (3)

Human Development and Family Sciences

- HDFS 518. Adult Development and Aging (4)
 HDFS 587. Social Gerontology (3)
 HDFS 617. Advanced Topics in Adult Development and Aging (3)

Nutrition

- NUTR 514. Health Benefits of Functional Foods, Nutraceuticals, and Dietary Supplements (3)
 NUTR 517. Human Nutrition Science (4)
 NUTR 518. Human Nutrition Science (4)

NUTR 523. Community Nutrition (4)
 NUTR/H 577. Dietary Interventions for Public Health (3)
 NUTR/EXSS 599/699. Special Topics in Nutrition Research: *Bone Physiology* (3)
 NUTR 599/699. Special Topics in Nutrition Research: *Advances in Cancer Research* (3)
 NUTR 599/699. Special Topics in Nutrition Research: *Advances in Metabolic Disease* (3)

Philosophy

PHL 544. Biomedical Ethics (4)
 PHL 555. Death and Dying (3)

Psychology

PSY 540. Cognition Research (4)
 PSY 598. Health Psychology (4)

Public Health

H 522. Health, Aging, and Control of Chronic Diseases (4)
 H 532. Economic Issues in Health and Medical Care (3)
 H 554. Epidemiology of Aging (3)
 H 567. Long-Term Care Alternatives (3)
 H 568. Financing and Administration of Long-Term Care (3)
 H 576. Program Planning/Proposal Writing in Health/Human Services (4)
 H/NUTR 577. Dietary Interventions for Public Health (3)

Sociology

SOC 532. Sociology of Aging (3)

COMMUNITY HEALTH GRADUATE MINOR

Graduate Areas of Concentration Community health

For more details, contact Sheryl Thorburn, Co-Director, 433 Waldo Hall, Oregon State University, Corvallis, OR 97331-6406, 541-737-9493; email: sheryl.thorburn@oregonstate.edu

GERONTOLOGY GRADUATE MINOR

Area of Concentration Gerontology

Gerontology refers to the study of aging, and also includes adult development. The existence of large numbers of individuals over the age of 65 is unprecedented in the history of humankind. In the next ten years, the number of older adults is expected to double in developed countries, and quadruple in the developing world. This growth will pose major challenges for societies in addressing the health, economic, and social needs of this population.

To address these challenges, students, researchers, and practitioners in the field of aging will need to take a multidisciplinary approach to solving these challenges, which will require an understanding of biological, psychological, socio-cultural, and design and engineering factors. Accordingly, we have designed a multidisciplinary minor, drawing upon faculty across campus, which is tailored to individual student needs.

Students are required to have a 3.0

GPA and to have one of the gerontology faculty on their committee. Students must take 18 credits, but can decide the classes in conjunction with their committee. Sample classes include:

H 536. Healthcare Organization Theory and Behavior (3)
 H 558. Reimbursement Mechanisms (3)
 H 576. Program Planning/Proposal Writing in Health/Human Services (4)
 H 568. Financing and Administration of Long-Term Care (3)
 H 599. Special Topics: "Epidemiology of Aging" (3)
 HDFS 518. Adult Development and Aging (4)
 HDFS 519. The Life Course (4)
 HDFS 565. Topics in Human Development and Family Sciences (3): "Psychosocial Factors in Aging", "Stress and Coping Across the Lifespan"
 HDFS 587. Social Gerontology (3)
 HDFS 617. Advanced Topics in Adult Development and Aging (3)
 NUTR 520. Medical Nutrition Therapy (5)
 PHL 544. Biomedical Ethics (4)
 PHL 555. Death and Dying (3)
 SOC 532. Sociology of Aging (3)

HUMAN DEVELOPMENT AND FAMILY STUDIES GRADUATE MINOR

For more details, see the graduate program director.

CERTIFICATES

GERONTOLOGY CERTIFICATE

Carolyn Aldwin, Director

Program on Gerontology
 Waldo Hall 437
 Oregon State University
 Corvallis, OR 97331-5102
 541-737-2024
 Email: Kaycee.headley@oregonstate.edu
 Website: <http://health.oregonstate.edu/sbhs/gerontology>

The Program on Gerontology offers an interdisciplinary approach to the study of aging. Because aging involves physiological, sociological, and psychological processes, gerontology education and research is relevant to many disciplines. Career opportunities in gerontology are extremely diverse and include positions in community services, health sciences, nutrition and dietetics, housing, health and physical education, pharmacy, counseling, health care administration, business, public policy, and many other arenas.

Recognizing the diversity of relevant disciplines and career opportunities, the OSU Program on Gerontology offers course work in gerontology through 10 schools/departments. The program is administered through the School of Social and Behavioral Health Sciences.

To be considered a gerontology course, at least 50 percent of the course content must address gerontology-related issues.

Gerontology courses include:

DHE 434/DHE 534. Housing the Aging Population (3)
 EXSS 414. Physical Activity and Aging (3)
 H 422/H 522. Health, Aging and Control of Chronic Diseases (4)
 H 432/H 532. Economic Issues in Health and Medical Care (3)
 H 436/H 536. Advanced Topics in Health Care Management (3)
 H 458/H 558. Reimbursement Mechanisms (3)
 H 465/H 565. *Public Health and Women: Social and Policy Issues (3)
 H 565. Public Health and Women: Social and Policy Issues (3)
 H 467/H 567. Long-Term Care Alternatives (3)
 H 468/H 568. Financing and Administration of Long-Term Care (3)
 H 536. Healthcare Organization Theory and Behavior (3)
 H 576/H 576. Program Planning/Proposal Writing in Health/Human Services (4)
 HDFS 314. Adult Development and Aging (4)
 HDFS 465/HDFS 565. Topics in Human Development and Family Sciences (3)
 HDFS 518. Adult Development and Aging (4)
 HDFS 519. The Life Course (4)
 HDFS 587. Social Gerontology (3)
 HDFS 617. Advanced Topics in Adult Development and Aging (3)
 NUTR 420/NUTR 520. Medical Nutrition Therapy (5)
 PHL 444/PHL 544. *Biomedical Ethics (4)
 PHL 455H/PHL 555. Death and Dying (3)
 PSY 350. Human Lifespan Development (4)
 SOC 432/SOC 532. Sociology of Aging (3)

Note: Other courses are approved annually by the Gerontology Program.

In addition to gerontology courses, seminars, field study (310/410/510/610), research (401/501/601), and projects (406/506/606) in gerontology are offered through the Gerontology Program. Field study, research, and projects in gerontology may also be available through other schools/departments. Students register for field study, research, or projects credit in the school or department that best meets their needs for supervision given the nature of the experience.

Graduate Study in Gerontology

OSU offers over 20 graduate-level gerontology courses plus field study and research opportunities. There are three ways to pursue significant graduate work in gerontology at OSU:

1. **Gerontology may be selected as an area of concentration for both master's and doctoral degrees in Human Development and Family Studies.** Students choosing this concentration will select adult development and aging course work and research in their major and may choose an integrated minor in gerontology.
2. **Gerontology is an integrated graduate minor (i.e., courses chosen from a variety of schools/departments)**

available to graduate students in any major field. The minor requires 18–36 credits, including HDFS 587, Social Gerontology. The balance of the course work is selected from graduate gerontology courses, field study, and/or research.

3. **Gerontology is an area of study in the Master's of Interdisciplinary Studies (MAIS) program.** MAIS students are required to take a minimum of 15 credits in gerontology, including HDFS 587, Social Gerontology. The balance of courses is selected from graduate gerontology courses, field study, and/or research.

Certificate Curriculum

Students earning a baccalaureate degree in any major at OSU may earn a Certificate in Gerontology. Certificate's increase students' employability in the many professional areas related to aging. Certification in gerontology is a nationally recognized way of identifying professionals' academic study in aging.

The Certificate in Gerontology requires 27 credits and includes a required core through which students study aging as an interactive process of physical, social, and psychological forces.

Gerontology Core (10 credits)

HDFS 314. Adult Development and Aging (4)
Any two of the following selected from two different schools/departments (6–7):

- DHE 434/DHE 534. Housing the Aging Population (3)
- H 422/H 522. Health, Aging and Control of Chronic Diseases (4)
- PSY 350. Human Lifespan Development (3)
- SOC 355. Death and Dying (4)

Field Study or Field Projects in Gerontology (3–6)

May be completed in any school/department:

- 310. Internship/Work Experience
- 401. Research and Scholarship
- 406. Special Problems/Special Projects and/or 410. Internship/Work Experience

Approved Gerontology Electives (12–15)

Additional Requirements

1. A grade of C or better in all gerontology courses. Overall GPA of 2.5.
2. Formal application to the program; forms available from the program office in Waldo Hall 437.
3. Certificate requirements fulfilled within five years following graduation. Students who have not completed certificate requirements upon receipt of the degree may continue as special, postbaccalaureate, or graduate students.

HEALTH MANAGEMENT AND POLICY GRADUATE CERTIFICATE

For more details about this graduate certificate, see the school advisor.

Required (12 credits)

- H 434/H 534. Health Care Law and Regulation (3)
- H 456/H 556. Strategic Management of Health Service Organizations (3)
- H 532. Economic Issues in Health and Medical Care (3)
- H 536. Health Services Administration and Management (3)

Electives (6 credits)

- H 530. Health Policy Analysis (3)
 - H 531. Health Care Marketing (3)
 - H 538. Public and Private Health Insurance (3)
 - H 539. Health Care Information Systems (3)
 - H 557. Financial Management of Health Care Organizations (3)
 - H 558. Reimbursement Mechanisms (3)
 - H 567. Long-Term Care Alternatives (3)
 - H 568. Financing and Administration of Long-Term Care (3)
 - H 599. Selected Topics (1-3)
- Other electives may be chosen with the consent of the student's advisor.

PUBLIC HEALTH GRADUATE CERTIFICATE

The graduate certificate in Public Health also is available via Ecampus.

MPH Core Courses (17 credits)

- H 512. Introduction to Environmental and Occupational Health Sciences (3)
- H 524. Introduction to Biostatistics (4)
- H 525. Principles of Epidemiology (4)
- H 533. Health Systems Organization (3)
- H 571. Principles of Health Behavior (3)

Electives (3 credits)

- H 530. Health Policy Analysis (3)
- H 536. Healthcare Organizational Theory and Behavior (3)

Total=20 credits

■ PUBLIC HEALTH COURSES

H 100. INTRODUCTION TO PUBLIC HEALTH (4).

A basic overview of public health. Uses a mix of lectures, guest speakers, classroom activities and homework to help students understand the role of public health in eliminating health disparities, understanding epidemics, and setting policy.

H 120. *HEALTH AND CULTURE: USING THEATRE TO PROMOTE HEALTH (3).

A fun and interactive way to promote safer sex and communication with your partner, cultural awareness, healthy body image, responsible drinking, and other health issues. Course work focuses on the major health and social issues facing college students, health disparities, cultural differences in health beliefs and behaviors, acting techniques and performance preparation skills. (Bacc Core Course)

H 199. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 16 credits.

H 210. *INTRODUCTION TO THE HEALTH CARE SYSTEM (3).

Provides tools to understand and critically assess the health care delivery system, its components, and the challenges created by its structure. The health care system will be considered from the perspective of several main players [e.g., patients, hospitals, doctors, health plans]. (Bacc Core Course)

H 220. INTRODUCTION TO HEALTH DATA ANALYSIS (3). Introduction to the application of biostatistics and probability to the health sciences. Topics include quantitative analysis and inference, statistical methods in the biosciences, and quantitative study to evaluate and control health problems. **PREREQS:** MTH 105 or MTH 111 or higher mathematics.

H 225. *SOCIAL AND INDIVIDUAL HEALTH DETERMINANTS (4). Overview of the macro (social/system/environmental) and micro (individual) contributors to premature disease, disability and population health. Selected behavioral theories supporting health risks and strategies for the prevention of premature disease/disability and the promotion of health. (Bacc Core Course)

H 250. INTRODUCTION TO HEALTH CARE MANAGEMENT (3). Participants will learn key principles, practices and personalities of health care management. The content is broadly applicable to health care enterprises of every kind: public health organizations, physician practices and clinics, hospitals and health systems, agencies and service organizations, for-profit firms, not-for-profit enterprises, etc. **PREREQS:** H 210*

H 309. PRACTICUM IN HEALTH CARE SERVICES (3-6). Supervised work experience in a health care service setting or health-related agency or program. Weekly progress reports and post-experience summary report and evaluation will be expected. Preplanned with instructor approval. Open to health care administration majors. Graded P/N. This course is repeatable for a maximum of 12 credits. **PREREQS:** Junior standing. Instructor consent required.

H 310. HEALTH FIELD EXPERIENCES (3-6). Introductory field experience in a health or health-related worksite. Graded P/N. This course is repeatable for a maximum of 12 credits. **PREREQS:** H 225 and H 210 and H 220 and junior standing.

H 312. *AIDS AND SEXUALLY TRANSMITTED DISEASES IN MODERN SOCIETY (3). Fundamental principles relating to etiology, nature, prevention, and control of AIDS and other sexually transmitted diseases in contemporary society; emphasis on social, psychological, legal, economic, and ethical issues surrounding these diseases. (Bacc Core Course)

H 319. INTRODUCTION TO HEALTH POLICY (3). Describe the policy development process, including problem conceptualization, agenda setting, role of interest groups and public opinion, analysis of alternatives and selection of policy alternative. **PREREQS:** H 210

H 320. INTRODUCTION TO HUMAN DISEASE (3).

Fundamental principles relating to etiology, nature, prevention, and control of communicable and noncommunicable diseases in human populations. Special emphasis on disease prevention and health promotion in the high risk diseases of modern, industrialized society.

H 344. FOUNDATIONS OF ENVIRONMENTAL HEALTH (3). Introductory course examining environmentally-linked disease, and health effects associated with toxic substances, food quality, pesticides, air, water, and noise pollution, and solid/hazardous wastes.

H 349. PEER HELPER SKILLS DEVELOPMENT (3).

Prepares the student for an active role as a peer helper in alcohol and drug abuse prevention and health education. Course work will include: drug, alcohol, addiction and other related health issues, basic listening and communication skills, conflict resolution, crisis recognition and referral. A major component will be affective learning situations designed to promote self-awareness and personal growth.

H 364. DRUGS, SOCIETY AND HUMAN BEHAVIOR (3). Drug use and abuse; theories of addiction; basic principles of drug action regarding

the use of sedative and stimulative compounds; alcohol; opiates; hallucinogens; designer drugs; cocaine; and over-the-counter products. Particular emphasis on the role of the individual's value orientation, decision-making, and self-responsibility in treatment and educational approaches to prevention. **PREREQS:** (PSY 201 or PSY 202)

H 364H. DRUGS, SOCIETY AND HUMAN BEHAVIOR (3). Drug use and abuse; theories of addiction; basic principles of drug action regarding the use of sedative and stimulative compounds; alcohol; opiates; hallucinogens; designer drugs; cocaine; and over-the-counter products. Particular emphasis on the role of the individual's value orientation. **PREREQS:** (PSY 201 or PSY 202) and Honors College approval required.

H 385. SAFETY AND HEALTH STANDARDS AND LAWS (3). Emphasis on the Occupational Safety and Health Act; study includes the scope and duties under the act, enforcement, and adjudication procedures and OSHA litigation; components of Oregon-OSHA.

H 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

H 399H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

H 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor's consent required.

H 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits.

H 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor's consent required.

H 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor's consent required.

H 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor's consent required.

H 407. SEMINAR (2). Seminar to prepare students for their internship in public health. This course is repeatable for a maximum of 6 credits. **PREREQS:** HMP (Health Management Promotion) option students are required to take H 436 in preparation and hold junior standing. HPHB (Health Promotion and Health Behavior) option students are required to take H 225 and H 320 and hold junior standing.

H 407H. SEMINAR (2). Seminar to prepare students for their internship in public health. This course is repeatable for a maximum of 6 credits. **PREREQS:** HMP (Health Management Promotion) option students are required to take H 436 in preparation and hold junior standing. HPHB (Health Promotion and Health Behavior) option students are required to take H 225 and H 320 and hold junior standing. Honors College approval required.

H 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor consent required.

H 409. PRACTICUM (1-6). Supervised work experience in a public health or health care administration setting. Open to majors in public health. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Senior standing and departmental approval.

H 410. INTERNSHIP (1-12). Directed field experience with participation in a community, worksite, or health agency program. Experience is individually arranged to meet student needs. Graded P/N. This course is repeatable for a maximum of 24 credits. **PREREQS:** For Health Promotion and Health Behavior students only: H 225, H 320, H 407, H 449 and H 476; junior standing and instructor approval.

H 417. MEDICAL AND PUBLIC HEALTH ENTOMOLOGY (3). Arthropod pests of man and domestic animals, including biology of pests, disease transmission mechanisms, epidemiology of important arthropod-borne diseases, and prevention and control of pest-related problems. **PREREQS:** Two terms of biology or general zoology.

H 418. PUBLIC HEALTH ETHICS AND ISSUES (3). Current ethical issues in public health, including gender and ethnicity in employment, pharmaceutical controls, product liability, advertising, and export of high technology. **PREREQS:** Senior standing.

H 421. MENTAL HEALTH (3). Examination of social, governmental, legal and individual mental health issues. Brief overview of some major mental disorders. **PREREQS:** (H 225 and H 320) and junior standing.

H 422. HEALTH, AGING AND CONTROL OF CHRONIC DISEASES (4). Epidemiology of the major chronic diseases, risk factors, potential methods of prevention/intervention, ethical issues, and efficacy of current methods of prevention and control. Emphasis on adult populations and public health services, policies, and programs at the local, state, and federal levels designed to promote healthy aging. **PREREQS:** 9 credits of health course work.

H 425. FOUNDATIONS OF EPIDEMIOLOGY (3). Measures of disease frequency; measures of effect; association and causation; sources of inaccuracy; experimental and observational study designs. **PREREQS:** (H 220 or ST 201) and junior standing.

H 429. INTERNATIONAL HEALTH (3). Overview of the epidemiological, economic, political, sociological, and cultural factors that impact on international health. Special emphasis on the methods of prevention/intervention utilized in coping with health problems on an international level. **PREREQS:** Senior standing.

H 431. HEALTH CARE MARKETING (3). Principles, elements and methods of marketing health care services. Role of the consumer, governing body, administration and medical staff as well as impact of professional ethics.

H 432. ECONOMIC ISSUES IN HEALTH AND MEDICAL CARE (3). Application of economic principles to the health care field: the demand for medical care and insurance, health care suppliers, health care markets. **PREREQS:** ((ECON 201 or ECON 201H) and H 210 and H 457) and junior standing.

H 434. ^HEALTH CARE LAW AND REGULATION (3). Legal aspects of health care delivery; tort law and its applications; professional liability and liability insurance; laws relative to health care institutions, cost controls, antitrust and access. (Writing Intensive Course) **PREREQS:** (H 210 and H 250) and Admission to HMP program and junior standing.

H 436. ADVANCED TOPICS IN HEALTH CARE MANAGEMENT (3). Covers how health services are governed and organized; how health care organizations assess and adapt to change; constraints/opportunities in shaping organizational performance; leadership; strategic decision-making and the use of evidence-based management in health care. **PREREQS:** (H 210 and H 250) and junior standing.

H 445. *OCCUPATIONAL HEALTH (3). Current and historical topics in the area of occupational health, with particular emphasis on the types of materials that produce human health effects; clinical and epidemiologic data used to assess the public health importance of occupational pollutants and to evaluate control strategies. (Bacc Core Course)

H 448. ENVIRONMENTAL & OCCUPATIONAL TOXICOLOGY & RISK ASSESSMENT (3). Introduction to the basic principles of

toxicology and risk assessment as they apply to environmental and occupational health. **PREREQS:** One year basic college chemistry and biology and two terms organic chemistry.

H 449. MASS MEDIA AND HEALTH (3). Designed to examine the effects of mass media on population health, from the negative impact of advertising of cigarettes, alcohol and junk food, to the (hopefully) positive impact of public-health campaigns. **PREREQS:** (H 225 and H 320) and junior standing.

H 456. STRATEGIC MANAGEMENT OF HEALTH SERVICE ORGANIZATIONS (3). Theories and methodologies of long-range planning and strategic management in health care organizations. **PREREQS:** Admission to HMP program.

H 457. FINANCIAL MANAGEMENT OF HEALTH CARE ORGANIZATIONS (3). Utilization of standard financial tools needed to manage the capital resources of health care organizations. Includes funding capital projects, product costing, budgeting methods, capital formation and investment strategies. **PREREQS:** (H 210 and H 250)

H 458. REIMBURSEMENT MECHANISMS (3). Introduces and analyzes the different types of healthcare reimbursement methodologies used in the U.S. health care system. **PREREQS:** H 210 and junior standing.

H 461. SEXUALITY: A HEALTH SCIENCE PERSPECTIVE (3). Exploration of the meaning of sexuality from a variety of contemporary health science perspectives; aspects of sex and sexuality fundamental to total health; issues central to the health educator role examined. **PREREQS:** Senior standing.

H 465. *PUBLIC HEALTH AND WOMEN: SOCIAL AND POLICY ISSUES (3). Public health approach to the identification of women's health needs in the United States and in other countries as it relates to the intersection of race, ethnicity, social class, sexual orientation, age, and ability. (Bacc Core Course) **PREREQS:** 6 credits in public health.

H 467. LONG-TERM CARE ALTERNATIVES (3). Overview of the long-term care alternatives. Comparisons of nursing homes with community based facilities; adult day care centers, respite to hospice facilities, social HMOs and other services; cost, quality of life and practicality are addressed.

H 468. FINANCING AND ADMINISTRATION OF LONG-TERM CARE (3). Examines the financing and administration of long term care. Emphasis is on a system-wide overview and specific application to nursing facility management. **PREREQS:** Admission to HMP program.

H 474. PUBLIC HEALTH AND VIOLENCE IN SOCIETY (3). Examination of violence as a major public health issue. Historical, social, environmental, economic, behavioral and psychological aspects of assaultive violence, spousal abuse, rape and sexual assault, child abuse, child sexual abuse, suicide, the effects of the media on violence, drug abuse and violence, and related public health problems in contemporary American society. Emphasis on health and the efficacy of current efforts aimed at ameliorating these problems and potential for alternative public health models for prevention and intervention.

H 476. ^PLANNING AND EVALUATING HEALTH PROMOTION PROGRAMS (4). A systematic approach to planning, implementing and evaluating health promotion programs in a variety of health related settings. Students will be writing a series of drafts to effectively develop a health promotion program plan. (Writing Intensive Course) **PREREQS:** (H 225 and H 320) and at least junior standing.

H 477. DIETARY INTERVENTIONS FOR PUBLIC HEALTH (3). A public health perspective on the

practice of population-based dietary intervention. Examination of relevant theories, research, and practice that pertain to health promoters/educators. CROSSLISTED as NUTR 477/NUTR 577. **PREREQS:** NUTR 225

H 489. EMERGENCY AND DISASTER MANAGEMENT (3). Study of preparedness, response, recovery and business resumption strategies, activities and applications needed to effectively deal with emergency and disaster incidents.

H 491. SELECTED TOPICS (1-3). Recent changes and advances in public health and health care administration and their application to special fields of study. Topics vary from term to term and year to year. This course is repeatable for a maximum of 6 credits. **PREREQS:** Senior standing.

H 491H. SPECIAL TOPICS (1-3). Recent changes and advances in public health and health care administration and their application to special fields of study. Topics vary from term to term and year to year. This course is repeatable for a maximum of 6 credits. **PREREQS:** Senior standing and Honors College approval required.

H 494. APPLIED ERGONOMICS (3). Principles of occupational ergonomics for managing optimal worker performance and well-being.

H 495. DESIGN FOR ENVIRONMENT, SAFETY, AND HEALTH (3). Systematic consideration of environmental, safety, and health concerns at the earliest possible stage in the lifecycle design engineering of products, technologies, and manufacturing processes. **PREREQS:** Junior or senior standing.

H 501. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Instructor approval required.

H 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 507. SEMINAR (1-16). Section 1. Internship (1). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 509. PRACTICUM (1-16). Supervised work experience in a public health or health care administration setting. Open to majors in public health. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Senior standing and departmental approval.

H 510. INTERNSHIP (1-16). Directed field experience with participation in a community, worksite, or health agency program. Experience is individually arranged to meet student needs. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Graduate standing in Public Health Department, instructor approval required, departmental approval required.

H 512. INTRODUCTION TO ENVIRONMENTAL & OCCUPATIONAL HEALTH SCIENCES (3). Introduction to environmental and occupational health. Hazards affecting human health are examined in the context of current social, political and regulatory pressures.

H 514. ENVIRONMENT, SAFETY AND HEALTH SEMINAR (1). One-credit graduate seminar on current topics of interest and importance to the environmental health and occupational safety

field. Critical reading of research publications, discussion of controversial issues facing ESH professionals, and/or presentation of current ESH research. This course is repeatable for a maximum of 3 credits.

H 515. RESEARCH METHODS IN SOCIAL AND BEHAVIORAL HEALTH SCIENCES (3). Provides an introduction to quantitative research methods and design. Topics include definition of research problems and questions, hypothesis generation, research design, sampling, variable definition and measurement, data collection, and ethical considerations. Also provides a brief introduction to qualitative and mixed methods.

H 517. MEDICAL AND PUBLIC HEALTH ENTOMOLOGY (3). Arthropod pests of man and domestic animals, including biology of pests, disease transmission mechanisms, epidemiology of important arthropod-borne diseases, and prevention and control of pest-related problems. **PREREQS:** Two terms of biology or general zoology.

H 518. PUBLIC HEALTH ETHICS AND ISSUES (3). Current ethical issues in public health, including gender and ethnicity in employment, pharmaceutical controls, product liability, advertising, and export of high technology. **PREREQS:** Graduate standing.

H 520. HEALTH DISPARITIES (3). Health disparities based on race/ethnicity, culture, social class, and rural/urban residence, among others; strategies to reduce disparities, promote health, and prevent disease in diverse populations.

H 521. MENTAL HEALTH (3). Focus upon mental health policy development, in relation to federal and state government services and regulations, implementation of services.

H 522. HEALTH, AGING AND CONTROL OF CHRONIC DISEASES (4). Epidemiology of the major chronic diseases, risk factors, potential methods of prevention/intervention, ethical issues, and efficacy of current methods of prevention and control. Emphasis on adult populations and public health services, policies, and programs at the local, state, and federal levels designed to promote healthy aging. **PREREQS:** 9 credits of public health course work.

H 523. FOUNDATIONS OF PUBLIC HEALTH (4). Fundamental principles, concepts and tools used in public health to promote the health of populations. Using a combination of case study method, lecture and discussion, students will develop a broad understanding of public health and recognition of how discipline-specializations address the social, behavioral and environmental determinants of public health. **PREREQS:** Graduate standing.

H 524. INTRODUCTION TO BIOSTATISTICS (4). Quantitative analysis and interpretation of health data including probability distributions, estimation of effects, and hypothesis-tests such as Chi-square, one-way ANOVA, and simple linear regression.

H 525. PRINCIPLES OF EPIDEMIOLOGY (4). Introduction to the concepts and methods of epidemiology. Topics include measures of population health, screening, study design, measures of association, and interpretation of epidemiological data.

H 526. EPIDEMIOLOGIC METHODS (3). Principles and methods of epidemiologic analysis; standardization; stratified analysis; confounding and its control; planning and conducting epidemiologic research; role of multivariate analysis in epidemiologic research. **PREREQS:** H 525

H 527. CASE STUDIES IN INTERNATIONAL HEALTH (3). International, public health challenges using case studies from different countries. Includes tropical disease and injury epidemiology in a variety of social, political, and economic contexts. **PREREQS:** Graduate standing.

H 528. GLOBAL HEALTH ISSUES (3). Examines major issues in health developments of global significance, their causes and impacts on international health, and methods and strategies to address them.

H 529. INTERNATIONAL HEALTH (3). Overview of the epidemiological, economic, political, sociological, and cultural factors that impact on international health. Special emphasis on the methods of prevention/intervention utilized in coping with health problems on an international level.

H 530. HEALTH POLICY ANALYSIS (3). Analysis of public policies affecting health care programs, services and organizations and the impact of those programs on citizens; processes by which health policy proposals are generated, promoted, defeated, modified and implemented.

H 531. HEALTH CARE MARKETING (3). Principles, elements and methods of marketing health care services. Role of the consumer, governing body, administration and medical staff as well as impact of professional ethics.

H 532. ECONOMIC ISSUES IN HEALTH AND MEDICAL CARE (3). Application of economics principles to the health care field: the demand for medical care and insurance, health care suppliers, health care markets. **PREREQS:** ECON 201

H 533. HEALTH SYSTEMS ORGANIZATION (3). Examines the nature of health and health care services and reviews the role of government and the free market on health services. Alternative ways of organizing, financing, and delivery of health care services are explored.

H 534. HEALTH CARE LAW AND REGULATION (3). Legal aspects of health care delivery; tort law and its applications; professional liability and liability insurance; laws relative to health care institutions, cost controls, antitrust and access.

H 536. HEALTHCARE ORGANIZATION THEORY AND BEHAVIOR (3). Administrative practice in health care settings with emphasis on long-term care and acute care services. Provides a framework for health care systems and managerial process and roles. Focus on operations, planning, marketing, human resources, finance, productivity and control as well as emerging trends in health services.

H 538. PUBLIC AND PRIVATE HEALTH INSURANCE (3). Introduction to the principles and practices of public or social and commercial health insurance, and their financial reimbursement mechanisms.

H 539. HEALTH CARE INFORMATION SYSTEMS (3). Information systems in health care institutions, programs, and services; review of managerial information needs and data collection and reporting mechanisms.

H 540. WATER AND HUMAN HEALTH (3). Critically examine the complex relationship between water quality, human activities, and population health.

H 541. AIR QUALITY AND HUMAN HEALTH (3). Examination of the major sources of air pollution, its impact on ecosystems and climate change, and population health. Will also discuss technologies and introduce regulations that are used to control air pollutants.

H 544. ENVIRONMENTAL AND OCCUPATIONAL EPIDEMIOLOGY (3). Examines exposure assessment methodology and epidemiological study designs that are commonly used in environmental and occupational health science in order to characterize the impact of environmental and occupational exposures on population health. **PREREQS:** H 525 and a graduate level statistics course.

H 545. OCCUPATIONAL HEALTH (3). A broad overview of occupational health including recognizing and preventing risks from toxic chemical, radiation and physical hazards in the workplace.

H 546. ENVIRONMENTAL AND OCCUPATIONAL SAMPLING (4). An overview of environmental and occupational sampling principles and practices for anticipating, recognizing, evaluating, and controlling exposures is provided.

H 548. ENVIRONMENTAL & OCCUPATIONAL TOXICOLOGY & RISK ASSESSMENT (3). Introduction to the basic principles of toxicology and risk assessment as they apply to environmental and occupational health. **PREREQS:** One year basic college chemistry and biology and two terms organic chemistry.

H 549. MASS MEDIA AND HEALTH (3). Examines the effects of mass media on population health, from the negative impact of advertising of cigarettes, alcohol and junk food, to the (hopefully) positive impact of public health campaigns. **PREREQS:** H 571

H 552. DISASTER EPIDEMIOLOGY (3). Describe the impact of natural and manmade disasters on human health, understand epidemiologic methods specific to disasters, and apply fundamental epidemiologic methods to identify and characterize disaster-related adverse health outcomes. **PREREQS:** H 525

H 554. EPIDEMIOLOGY OF AGING (3). An overview of the core principles of the epidemiology of aging is provided. There will be an emphasis on health and disease processes in older adults. Students will learn essential study design and analytic issues that may arise in studies of aging. **PREREQS:** H 525

H 555. CANCER EPIDEMIOLOGY (3). Introduction to basic concepts and methodology in cancer epidemiology. **PREREQS:** H 525

H 556. STRATEGIC MANAGEMENT OF HEALTH SERVICE ORGANIZATIONS (3). Theories and methodologies of long-range planning and strategic management in health care organizations.

H 557. FINANCIAL MANAGEMENT OF HEALTH CARE ORGANIZATIONS (3). Utilization of standard financial tools needed to manage the capital resources of health care organizations. Includes funding capital projects, product costing, budgeting methods, capital formation and investment strategies. **PREREQS:** H 210 and H 250

H 558. REIMBURSEMENT MECHANISMS (3). Techniques used in cost-effectiveness analysis. Examples are drawn from the public health and health economics literature. **PREREQS:** Graduate standing.

H 559. CONTRACTS AND NEGOTIATION (3). Different negotiation styles and strategies used in healthcare contracting are explored—distributive, integrative, and mixed motive negotiation styles. Students examine various contracts and the role the healthcare administrator plays in a variety of health care settings.

H 560. PUBLIC HEALTH SURVEILLANCE (3). An introduction to public health surveillance systems (national and international) for chronic and infectious diseases. Utility of existing surveillance systems for secondary epidemiological data analysis. **PREREQS:** H 524 and H 525 or instructor's consent.

H 561. SEXUALITY: A HEALTH SCIENCE PERSPECTIVE (3). Exploration of the meaning of sexuality from a variety of contemporary health science perspectives; aspects of sex and sexuality fundamental to total health; issues central to the health educator role examined. **PREREQS:** Graduate standing.

H 562. INFECTIOUS DISEASE EPIDEMIOLOGY (3). Understand epidemiologic methods specific to infectious diseases, apply fundamental epidemiologic methods to infectious disease questions, and describe the broad trends in global infectious disease burden. The application methods and principles will be explored through

lectures, discussions, assignments and writing projects. **PREREQS:** H 525

H 564. COMPUTING TOOLS AND HEALTH DATA ANALYSIS (3). Modern computational biostatistics for analyzing health data, emphasizing important technologies and methods for data processing and understanding of how they work. Topics will evolve over time as new procedures are developed. **PREREQS:** (H 524 or HDFS 530)

H 565. PUBLIC HEALTH AND WOMEN: SOCIAL AND POLICY ISSUES (3). Public health approach to the identification of women's health needs in the United States and in other countries as it relates to the intersection of race, ethnicity, social class, sexual orientation, age, and ability. **PREREQS:** 6 credits in public health.

H 566. DATA MINING IN PUBLIC HEALTH (3). An introduction to high-dimensional data analysis and data mining techniques used as an information technology tool to extract previously unknown and potentially useful information from large databases in biology, medicine, and public health. **PREREQS:** H 581 or permission of instructor; H 564 recommended.

H 567. LONG-TERM CARE ALTERNATIVES (3). Overview of the long-term care alternatives. Comparisons of nursing homes with community based facilities; adult day care centers, respite to hospice facilities, social HMOs and other services; cost, quality of life and practicality are addressed.

H 568. FINANCING AND ADMINISTRATION OF LONG-TERM CARE (3). Examines the financing and administration of long term care. Emphasis is on a system-wide overview and specific application to nursing facility management.

H 569. MATERNAL AND CHILD HEALTH (3). Women's reproductive health and health of children stressing causation, management, and prevention of public health problems. Epidemiological analysis of morbidity and mortality in children and women of childbearing age; impact of social, political and economic influences on the health of women and children; comparison of issues and problems of industrialized versus developing nations. Consideration of health issues of interest to the many diverse racial and ethnic groups of women and children in the U.S. as well as the global village.

H 570. WORKFLOW OF DATA ANALYSIS (3). Covers the management of workflow for studies involving data management and coordination including planning the work, documenting activities, creating, validating, and verifying variables, statistical analyses, replicating findings, and archiving work. Emphasizes tight control of data management: making changes to data in a documented and replicable manner. Lec/rec. **PREREQS:** HDFS 532 and /or equivalent or permission of instructor.

H 571. PRINCIPLES OF HEALTH BEHAVIOR (3). Theoretical approaches to behavior change in health promotion/education research and practice; factors influencing health behaviors, ethical behavior change issues, behavioral interventions for special populations.

H 572. COMMUNITY ORGANIZATION FOR HEALTH PROMOTION AND EDUCATION (3). History, theory, and practice of community organizing for health advocacy; focus on group processes, use of media, leadership, coalitions, grass roots methods and social change.

H 573. INTRODUCTION TO MULTILEVEL/ HIERARCHICAL MODELS (3). Introduction to the theory and application of hierarchical models to problems in epidemiology and public health. Hierarchical models will be dealt with using both frequentist and Bayesian frameworks. **PREREQS:** H 581 or permission of instructor.

H 574. PUBLIC HEALTH AND VIOLENCE IN SOCIETY (3). Examination of violence as a major public health issue. Historical, social, environmental, economic, behavioral and

psychological aspects of assaultive violence, spousal abuse, rape and sexual assault, child abuse, child sexual abuse, suicide, the effects of the media on violence, drug abuse and violence, and related public health problems in contemporary American society. Emphasis on health and the efficacy of current efforts aimed at ameliorating these problems and potential for alternative public health models for prevention and intervention.

H 575. EVALUATION OF HEALTH PROMOTION AND EDUCATION PROGRAMS (3). Provides theoretical and practical bases for program evaluation. Develops basic skills in a variety of approaches to evaluation, including techniques that are particularly suitable for evaluating health promotion, community health improvement, and related health and social services programs. Course learning is synthesized through designing an evaluation framework and methodology for a relevant program. **PREREQS:** H 515 and /or instructor consent.

H 576. PROGRAM PLANNING/PROPOSAL WRITING IN HEALTH/HUMAN SERVICES (4). Planning and preparing of proposals for program initiation, financing, delivery and evaluation in health-related settings; emphasis on funding sources, community, individual, and organizational support. **PREREQS:** 9 credits of graduate course work in public health.

H 577. DIETARY INTERVENTIONS FOR PUBLIC HEALTH (3). A public health perspective on the practice of population-based dietary intervention. Examination of relevant theories, research, and practice that pertain to health promoters/educators. CROSSLISTED as NUTR 477/NUTR 577. **PREREQS:** NUTR 225

H 578. INTRODUCTION TO MOLECULAR EPIDEMIOLOGY I (3). A survey of and introduction to the methods and issues arising in genetics and molecular epidemiology, including key biostatistical methods, study designs, and technologies used in the conduct of these studies. Students will gain experience conducting critical reviews of research papers with respect to study design and biostatistical analysis. **PREREQS:** (H 524 and H 526) and knowledge of and familiarity with basic concepts of molecular biology (DNA replication, transcription, and translation).

H 579. MOLECULAR EPIDEMIOLOGY II (3). An introduction to the data analysis methods arising in genetics and molecular epidemiology. Students will obtain hands-on experience with the analysis of high-throughput data obtained from population-based molecular studies. Lec/lab. **PREREQS:** (H 578 and H 581) and H 564

H 580. LINEAR REGRESSION AND ANALYSIS OF TIME TO EVENT DATA (4). Multiple linear regression analysis for measurement data and survival analysis methods for time to event health data, including modes of inference, diagnostics, model selection, and reporting conclusions. Lec/lab. **PREREQS:** (H 524 or HDFS 530)

H 581. GENERALIZED LINEAR MODELS AND CATEGORICAL DATA ANALYSIS (4). Biostatistical methods focusing on binary and count data will provide a foundation for understanding and implementing generalized linear regression and categorical data models that are commonly used to analyze epidemiological and public health data from cohort, case-control, and clinical trial study designs. Lec/lab. **PREREQS:** H 580

H 582. ANALYSIS OF CORRELATED HEALTH DATA (3). Biostatistical methods for clustered, repeated measures, and longitudinal correlated health data, with an introduction to applications of linear and generalized linear mixed models and generalized estimating equations. **PREREQS:** H 581

H 583. ENVIRONMENTAL AND OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT (3). The management principles and practices in the environment, safety and health profession are examined.

H 584. ANALYSIS OF INTERVENTION STUDIES AND CLINICAL TRIALS (3). Principles of data analysis from intervention studies and clinical trials, including professional graphical and tabular presentation, reproducibility and reliability of measurements, and controlling the Type I error rate when analyzing multiple endpoints. Basic principles of designing experiments are also covered including blocking, stratification, interaction, and control of variability. **PREREQS:** (H 524 or HDFS 530)

H 585. ENVIRONMENT, SAFETY AND HEALTH POLICY AND LAW (3). Survey of the environment, safety and health policy and law in the United States. Furnishes the basic knowledge and general understanding about policy and law-related issues important to all environmental health and safety professionals. **PREREQS:** H 385 or graduate standing.

H 586. BAYESIAN BIOSTATISTICS IN PUBLIC HEALTH (3). An examination of methods for designing and implementing Bayesian analysis to address scientific questions through hands-on experience with health data. This survey course also covers proper interpretation and communication of results from practical Bayesian methods for biostatistics data analysis, with illustrations of the utility of Bayesian ideas in public health. **PREREQS:** H 581

H 587. TIME TO EVENT ANALYSIS OF HEALTH DATA (3). Biostatistical models and methods for survival analysis of time to event data that are routinely encountered in biomedical and health research. **PREREQS:** (H 524 or HDFS 530)

H 588. APPLIED OCCUPATIONAL SAFETY AND HEALTH (3). The management and technical aspects of a workplace safety and health program are identified and assessed. Students completing the course receive a 30-hour OSHA General Industry card.

H 589. EMERGENCY AND DISASTER MANAGEMENT (3). Study of preparedness, response, recovery and business resumption strategies, activities and applications needed to effectively deal with emergency and disaster incidents.

H 591. SELECTED TOPICS (1-3). Recent changes and advances in public health and health care administration and their application to special fields of study. Topics vary from term to term and year to year. This course is repeatable for a maximum of 9 credits. **PREREQS:** Graduate standing.

H 592. SPATIAL BIOSTATISTICS AND EPIDEMIOLOGY (3). Epidemiologic and biostatistical methods for spatial analysis of health data. Topics include risks and rates, types of spatial data, visualizing spatial data, analysis of spatial point patterns, spatial clustering of health events based on case-control studies and based on regional counts, linking spatial exposure data to health events through regression modeling. **PREREQS:** H 581

H 594. APPLIED ERGONOMICS (3). Principles of occupational ergonomics for managing optimal worker performance and well-being.

H 595. DESIGN FOR ENVIRONMENT, SAFETY, AND HEALTH (3). Systematic consideration of environmental, safety, and health concerns at the earliest possible stage in the lifecycle design engineering of products, technologies, and manufacturing processes. **PREREQS:** Graduate standing.

H 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 24 credits.

H 601. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits.

H 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

H 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 608. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 610. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

H 612. DOCTORAL SEMINAR IN PUBLIC HEALTH: RESEARCH AND PRACTICE (1). Contemporary research and professional issues specific to the discipline of public health. Includes responsible conduct of research, writing for publication, professional development and leadership, and faculty research in public health. This course is repeatable for a maximum of 9 credits. **PREREQS:** Restricted to public health doctoral students.

H 613. INDEPENDENT RESEARCH PROJECT (1-9). Independent research project for PhD students, including research design, execution or research, and the formal presentation of findings in written form. Student will develop an original research topic based on knowledge and review of the literature in a public health-relevant area of inquiry. Graded P/N. This course is repeatable for a maximum of 9 credits.

H 614. RESEARCH MANUSCRIPT (4). PhD students write a manuscript to submit to a peer-reviewed journal as part of the course requirements. Graded P/N.

H 615. ADVANCED EVALUATION AND RESEARCH DESIGN (3). Provides an in-depth examination of advanced research designs and methods for establishing causal statements about the efficacy, effectiveness and generalizability of public health and social service interventions designed to alter public health and social risk or protective factors. **PREREQS:** H 515 and H 575 or instructor permission.

H 630. ADVANCED TOPICS IN HEALTH POLICY ANALYSIS (3). Survey and analyze the healthcare system in the United States, with an emphasis on new and emerging issues. An important aspect of the course will be to analyze past, present and potential solutions to improve the performance of the U.S. health system. **PREREQS:** H 530

H 632. ECONOMIC ISSUES IN HEALTH AND MEDICAL CARE (3). Demonstrate how economists think about healthcare issues. Emphasis on looking at a wide variety of health-related topics from an economist's perspective. By the end of the course, students should have a sense of how to use economic theory and empirical analysis to evaluate health policy issues.

H 635. COST EFFECTIVENESS ANALYSIS IN HEALTH AND MEDICAL CARE (3). The primary objective of this course is to introduce students to cost-effectiveness studies in health and medical care. Covers the core concepts of CEA, quality adjusted life years, cost calculations, and decision rules.

H 639. COMMUNITY-BASED PARTICIPATORY RESEARCH (4). Focuses on initiating and conducting research in partnership with communities. Includes in-depth examination of community-based participatory research (CBPR) elements, principles, theories, and approaches; how researchers can successfully partner with communities; and research with minority and/or underprivileged communities; with examples from environmental health, gerontology, and health promotion. **PREREQS:** 9 credits of public health

(H) or human development and family sciences (HDFS) graduate course work.

H 642. ENVIRONMENTAL AND REGULATORY RISK ASSESSMENT (3). Understand concepts, principles and practices in modern risk analysis and how they are utilized to make evidence-based decisions in public health. Focus will be on real world examples of risk assessment by environmental and occupational regulatory agencies.

H 643. SUSTAINABLE DEVELOPMENT AND ENVIRONMENTAL HEALTH (3). Introduction to the concepts and practices of sustainable development by examining the environmental, social, and economic dimensions of human health.

H 659. HEALTH POLICY RESEARCH METHODS (3). Familiarize doctoral students with the health policy research literature and selected questions in the field. The focus is an in-depth exploration of the research methods and technical details of the research literature. **PREREQS:** (H 515 and H 524)

H 671. ADVANCED THEORIES OF HEALTH BEHAVIOR (3). Provides an in-depth examination of major theories of health behavior (both health compromising and health enhancing). **PREREQS:** H 571 or permission of instructor.

H 672. ADVANCED QUALITATIVE METHODS IN HEALTH BEHAVIOR (3). Provides an in-depth examination of the use of qualitative methods in health behavior research and practice. **PREREQS:** H 515 and SOC 518 and HDFS 538; or permission of instructor.

H 673. MEASUREMENT OF HEALTH BEHAVIOR CONCEPTS (4). Provides in-depth study and field work for graduate students in public health and related fields of the methods used in the conceptualization, development, and evaluation of quantitative measures of health behavior and related concepts. **PREREQS:** H 524, H 515, and 3 credits in other quantitative research methods or social behavioral methods (e.g., in sociology or psychology or health promotion or education programs) or equivalents, or permission of instructor.

H 675. DEVELOPMENT OF HEALTH BEHAVIOR INTERVENTIONS (3). Examines the application of social/behavioral theories in health promotion interventions and in conducting intervention research in diverse populations. The course will focus on program development, on implementation strategies, and on translation into practice. **PREREQS:** (H 571 and H 575 and H 576) or equivalents or consent of instructor.

H 676. ADVANCED TOPICS IN HEALTH PROMOTION AND HEALTH BEHAVIOR (3). Examines topics of relevance to health promotion and health behavior. Specific topics include current issues and emerging research findings, with a focus on social and behavior science perspectives, analysis of public health problems, and application of principles and practices of health promotion and health behavior. This course is repeatable for a maximum of 6 credits. **PREREQS:** H 515 and H 571 or permission of instructor.

H 681. ADV TOPICS IN ENVIRONMENTAL & OCCUPATIONAL HEALTH & SAFETY (3). Advanced topics in the environment, safety and health discipline. Content varies with each offering.

H 682. ENVIR & OCCUP HLTH & SAFE: MOVING FROM RESEARCH TO PRACTICE (3). An examination of research transfer models that can be adapted and implemented to environmental and occupational settings. Case studies and content will vary with each course offering.

H 685. RACE, CLASS, CULTURE AND AGING (4). Examines the diversity among the older population in health status, health beliefs/behaviors, and health care, and explores the interaction of culture and structure as determinants of their life chances. The empirical

literature used in the course is drawn from the experiences of aging of African-American, Latino, and Asian-Pacific Islander elderly. Taught spring term even years. CROSSLISTED as HDFS 685. **PREREQS:** 9 credits of public health or HDFS graduate course work, or permission of instructor. **H 699. SPECIAL STUDIES (1-16).** This course is repeatable for a maximum of 16 credits.

■ HUMAN DEVELOPMENT AND FAMILY SCIENCES

HDFS 107. INTERNSHIP ORIENTATION (1). Exploration of career goals, internship opportunities, and the variety of practice areas in human services professions. Student preparation in planning, obtaining, and completing HDFS internships. Graded P/N.

HDFS 199. SPECIAL PROJECTS (1-16). Special projects designed with instructor Graded P/N. This course is repeatable for a maximum of 16 credits.

HDFS 201. *CONTEMPORARY FAMILIES IN THE U.S. (3). An introduction to families with application to personal life. Focuses on diversity in family structure, social class, race, gender, work and other social institutions. (Bacc Core Course)

HDFS 209. INTRODUCTORY INTERNSHIP (4). Field experience to learn, primarily through observation, how to apply human service intervention strategies and skills to helping individuals and families served by professional agencies and organizations. Supervision by agency and instructor. Requires 90 hours of work on-site. Supplementary bi-weekly seminar, readings, and reports. Graded P/N. This course is repeatable for a maximum of 8 credits. **PREREQS:** HDFS 107 and restricted to students in HDFS or OSU Gerontology Program. Application required.

HDFS 240. *HUMAN SEXUALITY (3). Physiological, psychological, social, and historical influences on sexuality; emphasis on developmental and relationship aspects. (Bacc Core Course)

HDFS 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

HDFS 311. INFANT AND CHILD DEVELOPMENT (4). Research and theory on development from infancy through middle childhood. Discussion of biological, familial, and sociocultural influences. Development of skills in observing children's behavior.

HDFS 312. PARENTING RESEARCH AND APPLICATION (4). Research and theory regarding parenting and parent education, including parenting styles and practices, discipline, parent-child interactions, attachment, and the family context with an emphasis on professional implications for promoting child health and well-being.

HDFS 313. ADOLESCENT DEVELOPMENT (4). Advanced theories and research on physical, social and psychological development during adolescence; emphasizes influences of family, peers, schools and community. **PREREQS:** Sophomore standing.

HDFS 314. ADULT DEVELOPMENT AND AGING (4). Advanced theories and research related to developmental changes and stability in early, middle, and late adulthood. Gender issues, personality, cognition, and adaptation. **PREREQS:** Upper-division standing.

HDFS 330. FOSTERING LEARNING IN EARLY CHILDHOOD DEVELOPMENT (4). Development of skills in applying theoretical approaches to observing, recording, and interpreting the behavior of young children in order to design interactions that support learning in group settings. **PREREQS:** (HDFS 211 or HDFS 311)

HDFS 331. DIRECTED EXPERIENCE IN EARLY CHILDHOOD (3). Placement in early childhood program to focus on guidance techniques,

classroom management, and implementation of curricula, based on developmental observation, research, and theory. Supplementary weekly seminar, readings, and reports. Lab/rec. Taught on the OSU-Cascades campus only. **PREREQS:** ((HDFS 311 or HDFS 211) and HDFS 330) and Application required.

HDFS 341. FAMILY STUDIES (4). Study of family forms, family formation, and family change over the human life course is sociohistorical, economic, political, and cultural context.

HDFS 360. CRITICAL THINKING IN HUMAN DEVELOPMENT AND FAMILY SCIENCES (4). Explores foundations of critical thinking, especially methods for sustaining open-minded inquiry and evaluating evidence and arguments. Current controversies in human development and family policy are targets of debate. **PREREQS:** HDFS majors only.

HDFS 361. APPLIED RESEARCH METHODS (4). Basic research methods as they are applied in human development and family studies. This course includes a lab. **PREREQS:** ((ST 201 and ST 202) or H 220 or ST 351)

HDFS 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

HDFS 401. RESEARCH (1-6). This course is repeatable for a maximum of 16 credits.

HDFS 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits.

HDFS 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

HDFS 405. READING AND CONFERENCE (1-6). This course is repeatable for a maximum of 16 credits.

HDFS 406. PROJECTS (1-6). This course is repeatable for a maximum of 16 credits.

HDFS 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

HDFS 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

HDFS 410. ADVANCED INTERNSHIP (10). Field experience to apply theory and empirical research to individual-, family-, and community-level interventions in professional settings. Focus is on analyzing needs of clients, developing goals, and designing and implementing plans of action. Application of human service ethics is emphasized. Supervision by agency and instructor. Requires 270 hours of work on-site. Supplementary bi-weekly seminar, readings, and reports. Graded P/N. This course is repeatable for a maximum of 20 credits. **PREREQS:** (HDFS 209 and HDFS 462) and junior or senior standing. Restricted to students in HDFS and OSU Gerontology Program. Application required.

HDFS 430. ^STUDENT TEACHING IN EARLY CHILDHOOD DEVELOPMENT & EDUCATION (12). Participation in a research-based model early childhood program focused on student teaching, program development and evaluation, parent education and administration. Placement to be reserved one year in advance. Lec/lab. (Writing Intensive Course) **PREREQS:** HDFS 330

HDFS 431. FAMILY, SCHOOL, AND COMMUNITY COLLABORATION (3). Focus on family, school, community environments and interactions for children from infancy to adolescence. Resources and skills for enhancing child development across these settings are emphasized. **PREREQS:** (HDFS 311 or HDFS 313) and HDFS 211 or HDFS 313

HDFS 432. CHILDREN AND YOUTH WITH SPECIAL NEEDS (3). Developmental, educational, and family issues related to children and youth with disabilities and giftedness. **PREREQS:** 6 credits of HDFS, SOC or PSY.

HDFS 444. FAMILY VIOLENCE AND NEGLECT (4). Examination of the causes and consequences of family abuse and neglect, including child abuse, domestic violence and elder abuse. **PREREQS:** 6 credits of HDFS, SOC or PSY.

HDFS 447. *FAMILIES AND POVERTY (4). Examines families in poverty focusing on causes and consequences of family poverty, including global economic factors, migration patterns, discrimination, and policies and programs for families. Community service required. (Bacc Core Course)

HDFS 447H. *FAMILIES AND POVERTY (4). Examines families in poverty focusing on causes and consequences of family poverty, including global economic factors, migration patterns, discrimination, and policies and programs for families. Community service required. (Bacc Core Course) **PREREQS:** Honors College approval required.

HDFS 461. ^PROGRAM DEVELOPMENT AND PROPOSAL WRITING (4). Principles of program development and evaluation applied to the development of a proposal for a human services program; analysis of needs and resources, identification of empirically-based strategies, and assessment. (Writing Intensive Course) **PREREQS:** HDFS 360

HDFS 462. SKILLS FOR HUMAN SERVICES PROFESSIONALS (4). Explores assessment, case management, and advocacy; helping skills; self-care and ethical conduct; organizational dynamics; application through case studies and interactive learning. **PREREQS:** Senior standing, Human Services option specialization.

HDFS 465. TOPICS IN HUMAN DEVELOPMENT AND FAMILY SCIENCES (3). Topics and issues in human development and family sciences. Examples: children and the law; gender and families; parenting; aging; relationship development across the lifespan. This course is repeatable for a maximum of 18 credits. **PREREQS:** 6 credits of HDFS, SOC or PSY.

HDFS 465H. TOPICS IN HUMAN DEVELOPMENT AND FAMILY SCIENCES (3). Topics and issues in human development and family sciences. Examples: children and the law; gender and families; parenting; aging; relationship development across the lifespan. This course is repeatable for a maximum of 18 credits. **PREREQS:** 6 credits of HDFS, SOC or PSY and Honors College approval required.

HDFS 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

HDFS 499H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

HDFS 501. RESEARCH (1-6). This course is repeatable for a maximum of 16 credits.

HDFS 502. INDEPENDENT STUDY (1-6). This course is repeatable for a maximum of 16 credits.

HDFS 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

HDFS 505. READING AND CONFERENCE (1-6). This course is repeatable for a maximum of 16 credits.

HDFS 506. SPECIAL PROBLEMS/SPECIAL PROJECTS (1-6). This course is repeatable for a maximum of 16 credits.

HDFS 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

HDFS 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

HDFS 509. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits.

HDFS 510. INTERNSHIP (3-15). This course is repeatable for a maximum of 16 credits.

HDFS 511. THEORIES OF HUMAN DEVELOPMENT (4). Critical examination of significant theories of human development. Emphasizes evolution of theories and impact on current human development research.

HDFS 516. CHILD DEVELOPMENT (4). Study of theories, concepts, and issues related to physical, cognitive, social, and emotional development in infants and children. Covers family contexts, risk and resilience, nature/nurture issues, critical/sensitive periods, the importance of early experience, and the relationship between basic and applied research. **PREREQS:** 15 quarter credits of social and behavioral sciences.

HDFS 517. ADOLESCENT DEVELOPMENT (4). Study of theories, concepts, and issues related to biological, cognitive, social, and emotional development in adolescents. Covers identity formation, family contexts, adolescent sexuality, societal contexts for adolescent development, and risk and resilience processes. **PREREQS:** 15 quarter credits of behavioral and social sciences.

HDFS 518. ADULT DEVELOPMENT AND AGING (4). Study of theories, concepts, and issues related to biological, cognitive, social, and emotional development throughout adulthood. Covers life transitions, stress-related growth, optimal aging, wisdom, and developmental methods. **PREREQS:** 15 quarter credits of behavioral and social sciences.

HDFS 519. THE LIFE COURSE (4). Introduces students to key concepts, principles, and controversies in life-course studies. Emphasizes how the nature and rhythm of the life course is structured by time and place. Examines how the lives of individuals and groups are shaped by history, demography, social institutions, states and policies, and culture.

HDFS 530. RESEARCH IN HUMAN DEVELOPMENT AND FAMILY SCIENCES I (4). An overview of research design, measurement, sampling and evaluation research. Introduces computer applications for data collection and analysis. Lec/lab. **PREREQS:** Undergraduate statistics and 12 credits of social science courses.

HDFS 531. RESEARCH IN HUMAN DEVELOPMENT AND FAMILY SCIENCES II (4). Philosophy and methods of behavioral research including experimental design and advanced evaluation research techniques. Lec/lab/rec. **PREREQS:** H 524 or HDFS 530

HDFS 532. RESEARCH IN HUMAN DEVELOPMENT AND FAMILY SCIENCES III (4). An in-depth study of research methods related to human development and family studies. Covers multivariate procedures, path analysis, causal modeling, and related techniques. **PREREQS:** HDFS 531

HDFS 533. SOCIAL POLICY AND HUMAN DEVELOPMENT (4). Probes how policies and governments affect human development over the life course. Examines experiences in family, education, work, and health. Families are a central lens for examining effects. Offered alternate years.

HDFS 534. SOCIAL PROGRAM AND POLICY EVALUATION (4). Models of evaluation and application of applied research methods to social programs and policies. **PREREQS:** HDFS 531

HDFS 538. QUALITATIVE RESEARCH METHODS I (4). Critical survey of qualitative approaches in social science research. Examines historical roots, epistemological perspectives, and ethical issues. Includes ethnographic and observational methods, interview, grounded theory, case study, and participatory approaches. **PREREQS:** 15 quarter credits of behavioral and social sciences.

HDFS 539. QUALITATIVE METHODS II (4). Critical survey of qualitative approaches in social science research. Examines historical roots, epistemological perspectives, and ethical issues. Includes ethnographic and observational methods,

interview, grounded theory, case study, and participatory approaches. Application of qualitative methods through completion of a qualitative research project. **PREREQS:** HDFS 538

HDFS 541. FAMILY STUDIES (4). Critical survey of current research in family studies with a focus on diverse family structures and processes. **PREREQS:** 15 quarter credits of behavioral and social sciences.

HDFS 546. THEORIES OF FAMILY STUDIES (4). An overview of the major theoretical perspectives used in the study of families. Issues of theory construction and evaluation are also covered. Course goal is to enable the student to apply conceptual frameworks to a particular area of interest.

HDFS 547. FAMILIES AND POVERTY (3). Examines families in poverty focusing on causes and consequences of family poverty, including global economic factors, migration patterns, discrimination, and policies and programs for families.

HDFS 565. TOPICS IN HUMAN DEVELOPMENT AND FAMILY SCIENCES (3). Topics and issues in human development and family sciences. Examples: children and the law; gender and families; parenting; aging; relationship development across the lifespan. This course is repeatable for a maximum of 18 credits. **PREREQS:** 6 credits of HDFS, SOC or PSY.

HDFS 587. SOCIAL GERONTOLOGY (3). An introduction to aging research targeted toward understanding demographics of aging societies, lifespan theories, methods of aging research, psychosocial aging processes, family and caregiving issues, housing and long-term care, and current social policies.

HDFS 601. RESEARCH (1-6). This course is repeatable for a maximum of 16 credits.

HDFS 602. INDEPENDENT STUDY (1-6). This course is repeatable for a maximum of 16 credits.

HDFS 603. DISSERTATION (1-16). This course is repeatable for a maximum of 999 credits.

HDFS 605. READING AND CONFERENCE (1-6). This course is repeatable for a maximum of 16 credits.

HDFS 606. SPECIAL PROJECTS (1-6). This course is repeatable for a maximum of 16 credits.

HDFS 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

HDFS 608. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits.

HDFS 610. INTERNSHIP (3-15). This course is repeatable for a maximum of 16 credits.

HDFS 616. ADVANCED TOPICS IN CHILD-ADOLESCENT DEVELOPMENT (3). Advanced critical study of theory and research related to specific topics of social, emotional, and cognitive development during infancy, childhood and/or adolescence. This course is repeatable for a maximum of 6 credits.

HDFS 617. ADVANCED TOPICS IN ADULT DEVELOPMENT AND AGING (3). Advanced critical study of theory and research related to specific topics of social and emotional development and stability in adulthood, including later life. This course is repeatable for a maximum of 9 credits.

HDFS 630. QUANTITATIVE METHODS IN FAMILY AND INDIVIDUAL DEVELOPMENT (3). Advanced quantitative techniques in human development and family studies. Includes longitudinal designs, structural equation modes. Content varies with each offering. This course is repeatable for a maximum of 9 credits. **PREREQS:** HDFS 532

HDFS 639. COMMUNITY-BASED PARTICIPATORY RESEARCH (4). Focuses on initiating and conducting research in partnership

with communities. Includes in-depth examination of community-based participatory research (CBPR) elements, principles, theories, and approaches; how researchers can successfully partner with communities; and research with minority and/or underprivileged communities; with examples from environmental health, gerontology, and health promotions. **PREREQS:** 9 credits of public health or human development and family sciences graduate course work.

HDFS 665. TEACHING IN HUMAN DEVELOPMENT AND FAMILY SCIENCES (1). Principles and practices of pedagogy in human development and family sciences related to both on-campus and Ecampus instruction. Graded P/N. This course is repeatable for a maximum of 6 credits.

HDFS 685. RACE, CLASS, CULTURE AND AGING (4). Examines the diversity among the older population in health status, health beliefs/behaviors, and health care, and explores the interaction of culture and structure as determinants of their life chances. The empirical literature used in the course is drawn from the experiences of aging of African-American, Latino, and Asian-Pacific Islander elderly. Taught spring term even years. CROSSLISTED as H 685. **PREREQS:** 9 credits of public health or HDFS graduate course work, or permission of instructor.

HDFS 699. SPECIAL TOPICS (1-4). This course is repeatable for a maximum of 8 credits.

HDFS 808. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Application to Early Childhood Leadership Directions.

■ 4H YOUTH DEVELOPMENT EDUCATION

YDE 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

YDE 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits.

YDE 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

YDE 406. PROJECTS (1-3). This course is repeatable for a maximum of 3 credits. **PREREQS:** Departmental approval required.

YDE 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

YDE 410. INTERNSHIP/WORK EXPERIENCE (1-16). This course is repeatable for a maximum of 16 credits.

YDE 431. EDUCATIONAL DESIGN FOR COMMUNITY-BASED YOUTH DEVELOPMENT PRO (3). Students will explore how youth and adult development takes place within the community context. Using theories and research-supported practices, student practitioners will examine the standards in effective instructional design/program evaluation and how to apply these standards in their creation of educational programs. **PREREQS:** TCE 216 and TCE 219 and TCE 253 and TCE 320 and TCE 216 and TCE 219 and TCE 253 and TCE 320

YDE 467. ORGANIZATIONAL DEVELOPMENT (3). Students will examine models, theories, and practical examples of organizational development in the context of out-of-school educational program delivery. Course work is designed to provide future youth development professionals with the core competencies necessary to manage organizations, staff, and educational programs. **PREREQS:** TCE 216 and TCE 219 and TCE 253 and TCE 320 and TCE 216 and TCE 219 and TCE 253 and TCE 320

YDE 484. LEADERSHIP AND MANAGEMENT (2). Students will be introduced to the scholarly disciplines of leadership and management and

how they are applied in community or workplace settings. Students will be introduced to various leadership models and theories with the goal of helping them synthesize and apply a personalized approach to leadership. **PREREQS:** TCE 216 and TCE 219 and TCE 253

YDE 492. EXPERIENTIAL PROGRAM

DESIGN (2). Students will obtain an overview of experiential education and its application in various out-of-school settings. They will develop an understanding of how to design experiential education programs for all stages of youth/adult development and different settings based on research, application of «best practices,» and community/organizational needs assessment.

PREREQS: TCE 216 and TCE 219 and TCE 253 and TCE 320 and TCE 216 and TCE 219 and TCE 253 and TCE 320

YDE 493. APPLIED INSTRUCTIONAL

METHODS (2). Students will obtain an overview of instructional techniques and methods and their application to various out-of-school, community settings. Student practitioners will be expected to demonstrate proficiencies in utilizing different methods and in matching instructional delivery with the learning audience. **PREREQS:** TCE 216 and TCE 219 and TCE 253 and TCE 320 and YDE 431 and YDE 492 and TCE 216 and TCE 219 and TCE 253 and TCE 320 and YDE 431

YDE 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

For more than a century, military training has been offered at Oregon State University. Fulfilling a provision of the Morrill Act of 1862, which gave Corvallis College its first public support, an Army Cadet Corps was organized in 1873.

ROTC at Oregon State is made up of the departments of Military Science, Naval Science, and Aerospace Studies. In 1917, the Department of Military Science became responsible for all military training under the National Defense Act of 1916. This act expanded and standardized the training of Army officers by colleges and universities and established the Reserve Officer Training Corps (ROTC). During World War II, OSU became known as the "West Point of the West" for commissioning more officers than any other nonmilitary academy in the nation. At the end of World War II, the secretary of the Navy commissioned the Department of Naval Science (NROTC) on this campus to provide the training of both Navy and Marine Corps officers. On July 1, 1949, the U.S. Air Force activated an AFROTC unit that today is called the Department of Aerospace Studies. OSU is now one of 48 colleges and universities that offers education for all three military departments.

Originally, two years of military science and tactics were required of all able-bodied male students, but since 1962, ROTC has been voluntary. Since 1965, two-year programs have been available for students who have finished two years of college but have not taken ROTC previously.

As opportunities for women to serve as officers in the armed forces grow, opportunities for women to participate in ROTC programs expand. Women have long been eligible to take ROTC course work for credit. Since 1970, they have been enrolled as cadets in Air Force ROTC and, since 1973, have also been enrolled as cadets and midshipmen in the Army and Navy ROTC programs.

MISSION AND OBJECTIVES

The ROTC selects and prepares young men and women, through a program of instruction coordinated with the student's normal academic curriculum, for commissioning and service as officers in the regular and reserve components of the Army, Navy, Air Force, and Marine Corps.

UNIFORMS AND ALLOWANCES

Students in each of the units receive uniforms to be worn at drill periods and on special occasions. Travel to and from any summer camps or cruises is paid. While at camp or on cruise, the members receive food and quarters at government expense in addition to basic pay. (See the individual sections for further information on the various camps and cruises.) Those selected for the scholarship programs receive tuition, books, and fees plus \$250 to \$500 a month subsistence pay for up to 40 months.

FLIGHT TRAINING

Eligible Army, Navy, Marine Corps, and Air Force ROTC students may be selected for flight training upon their successful completion of the program and commissioning. AFROTC cadets may be eligible to receive up to eight hours of flight orientation for free through the Civil Air Patrol.

HOW TO ENROLL

See the Army, Navy, or Air Force sections of this catalog for enrollment details for the various ROTC programs. All three departments have staff available throughout the year during normal school hours to answer any inquiries regarding the ROTC programs.

AEROSPACE STUDIES

Lieutenant Colonel Robb E. Owens,
Commander

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FACULTY

Professor Lt. Col. Robb E. Owens

Assistant Professor Capt. Josh Burnett

Minor

Aerospace Studies

The Aerospace Studies program prepares students for careers as Air Force officers while simultaneously completing any university undergraduate or graduate degree.

Aerospace Studies courses are open to all university students. The courses are taught by Air Force officers. If students desire a career as an Air Force officer, they must complete all Air Force Reserve Officer Training Corps (AFROTC) requirements.

The U.S. Air Force's mission is to "Fly, Fight and Win in Air, Space and Cyberspace." Whether a student's interest lies in flying advanced aircraft, operating sophisticated outer space systems, defending America's cyberspace infrastructure, researching and developing state-of-the-art technology, or working as a language interpreter, defense intelligence officer, medical or legal professional, the Aerospace Studies Department can guide students to exciting and challenging opportunities.

SCHOLARSHIPS

If students qualify, scholarship opportunities are available.

High school students must apply online by December 1, the year before they begin college in order to compete for a scholarship while still in high school. Students will find application procedures and forms at <http://www.afrotc.com/>.

Air Force ROTC scholarships cover up to 100% of tuition, laboratory fees, and incidental expenses. ROTC scholarship students will also receive \$900 annually for textbooks and a monthly tax-free stipend of up to \$500. Students must apply and be accepted into the AFROTC program and agree to accept an Air Force officer commission and service commitment upon graduation.

For details on Air Force scholarships, contact the AFROTC Detachment, McAlexander Fieldhouse, Room 303, 541-737-3291, 800-633-7352 or email: afrotc@oregonstate.edu. Website: <http://flying-beavs.com/> or <http://www.afrotc.com/>.

ALLOWANCES, UNIFORMS, TEXTBOOKS

Students on an Air Force ROTC scholarship or enrolled in the ROTC Professional Officer Course are paid a monthly stipend of up to \$500. Uniforms and textbooks for all Aerospace Studies courses are provided by the Air Force.

AIR FORCE ROTC PROGRAMS

Multiple Air Force ROTC programs are available. Students who qualify may elect to pursue either of these programs.

Four- or Three-Year Program

The four- or three-year program consists of the General Military Course: six quarters of lower-division Aerospace Studies classes, including a laboratory each term, and the Professional Officer Course: six quarters of upper-division Aerospace Studies classes, including a laboratory each term. Four- or three-year cadets attend four weeks of expeditionary summer field training (AS 304) prior to their junior year of college.

Previous military experience—ROTC, academy, or military service—may allow the Professor of Aerospace Studies to waive all or part of the General Military Course (first-year and sophomore years) for students enrolled in the four-year AFROTC program.

Students may enter the first-year class during the fall, winter, or spring term. Sophomore students may take the first-year and sophomore level courses concurrently. Prior to enrolling in the last two years of the program, the Professional Officer Course, the student must meet AFROTC qualification standards and requirements.

Two-Year Program

(Currently not available.)

This program provides an opportunity for students who did not enter ROTC previously. Entry is on a competitive basis. Selectees attend mandatory five-week summer field training (AS 304) two summers before commissioning with a bachelor's, master's or doctorate degree. Applicants must have one year remaining in college after the five-week field

training. The curriculum includes a five-week field training and six quarters of upper-division Aerospace Studies classes, including a laboratory each term.

COMMITMENTS

Students in the four-year program incur no obligation during their first two years in AFROTC unless on scholarship. The student agrees to accept a commission, if offered, only after enrolling in AS 311. High school scholarship students incur a commitment at the beginning of their sophomore year. Upon accepting their commissions, students incur a four-year commitment; pilots incur a 10-year obligation after completion of pilot training; combat systems officers and air battle managers incur a six-year obligation after initial training. Graduates pursuing medical school incur a four-year commitment after medical school.

STANDARDS

Cadets must be U.S. citizens of sound physical condition, maintain academic standards and high moral character. Air Force physical fitness standards must be met prior to attending field training and commissioning.

Cadets must be commissioned as Air Force officers prior to age 30.

FURTHER EDUCATIONAL OPPORTUNITIES

After completion of AFROTC requirements, advanced degrees may be sought by delaying active duty commitments. Some commissioned officers continue advanced studies through fully-funded Air Force Institute of Technology or other DoD-sponsored programs.

FIELD TRAINING

Under the Air Force ROTC program, one summer field training session is required, normally after the AS 200 year. Successful completion of field training is required for all cadets prior to membership in the Professional Officer Course. Students are paid varying amounts during field training.

AEROSPACE STUDIES MINOR

The Department of Air Force Studies offers a minor open to any OSU student. Students gain a broad exposure to the concepts of aerospace power, leadership and management, and general military studies. A student cannot use a course for this minor that is used being for their major.

Required (18)

- AS 311. Leadership Fundamentals, Team Building and Problem Solving (3)
- AS 312. Effective Supervision and Group Conflict Management (3)
- AS 313. Leadership, Ethics, Air Force Core Values and Accountability (3)
- AS 411. National Security Affairs (3)

- AS 412. World Regional Cultural Studies (3)
- AS 413. Preparation for Active Duty (3)

Electives (minimum 9)

- AS 211. The Evolution of Air and Space Power 1860–1945 (1)
- AS 212. The Evolution of Air and Space Power 1945–1990 (1)
- AS 213. The Evolution of Air and Space Power 1991–2025 (1)
- AS 320. Leadership Laboratory (1)
(maximum of 3 credits)
- AS 420. Leadership Laboratory (1)
(maximum of 3 credits)
- COMM 322. Small-Group Problem Solving (3)
- COMM 440. Theories of Conflict and Conflict Management (3)
- COMM 446. *Communication in International Conflict and Disputes (3)
- HST 316. The American Military, 1607–1865 (4)
- HST 317. *Why War? A Historical Perspective (4)
- HST 318. The American Military, 1865–Present (4)
- HST 464. American Diplomatic History (4)
- HST 465. *American Diplomatic History (4)
- MS 211. Military Science II: Foundations of Leadership I (2)
- MS 212. Military Science II: Foundations of Leadership II (2)
- MS 213. Military Science II: Fundamentals of Military Operations (2)
- NS 321. Evolution of Warfare I (3)
- NS 322. Evolution of Warfare II (3)
- PAX 201. Study of Peace and the Causes of Conflict (3)
- PHL 344. *Pacifism, Just War, and Terrorism (4)
- PS 201. *Introduction to US Government and Politics (4)
- PS 205. *Introduction to International Relations (4)
- PS 454. International Law and Organizations (4)

Total=27

Footnote:

* Baccalaureate Core Course

COURSES

AS 111. FOUNDATIONS OF THE AIR FORCE PART I (1). The introduction to the Air Force mission and organization. Featured topics include Air Force dress and appearance stand standards; military customs and courtesies, Air Force heritage, overview of the Department of the Air Force, and Air Force core values. Basic oral and written communication will be assessed. **PREREQS:** Taken concurrently with AS 120 for fully eligible General Military Course students.

AS 112. FOUNDATIONS OF THE AIR FORCE PART II (1). Second part of the introduction to the Air Force mission and organization. Featured topics include Air Force career opportunities, Air Force benefits, military communication skills, Air Force installations, and look at the basic characteristics of war. Basic oral and written communication will be assessed. **PREREQS:** Taken concurrently with AS 120 for fully eligible General Military Course students.

AS 113. FOUNDATIONS OF THE AIR FORCE PART III (1). Third part of the introduction of what the Air Force is about and what the Air Force has to offer. Featured topics include basic leadership, team building, interpersonal skills, diversity in the Air Force, and the oath of office

and commissioning. Basic oral and written communication will be assessed. **PREREQS:** Taken concurrently with AS 120 for fully eligible General Military Course students.

AS 120. LEADERSHIP LABORATORY (1). Cadets learn officership, leadership, drill and ceremony, and customs and courtesies. Lab. Graded P/N. This course is repeatable for a maximum of 3 credits. **PREREQS:** Departmental approval. Taken concurrently with AS 111, AS 112 and AS 113. Only offered to students enrolled in the AFROTC officer commissioning program.

AS 211. EVOLUTION OF AIR AND SPACE POWER 1860-1945 (1). Study of the development of air power, concepts, and doctrine from its beginnings to the end of World War II. Historical examples examined include balloons, dirigibles, Wright Brothers' first flight, and the role of air power in World War I and II. Oral and written communication skills will be assessed. **PREREQS:** If enrolled in the AFROTC officer commissioning program, must be taken concurrently with AS 220.

AS 212. THE EVOLUTION OF AIR AND SPACE POWER 1945-1990 (1). Study of the development of air power, concepts, and doctrine during the Cold War. Historical examples examined include the Berlin Airlift, nuclear deterrence, and the role of air power employment in the Korean and Vietnam conflicts. Oral and written communication skills will be assessed. **PREREQS:** Taken concurrently with AS 220 if fully eligible General Military Course student.

AS 213. EVOLUTION OF AIR AND SPACE POWER 1991-2025 (1). Study of the factors contributing to the development of air power, concepts, and doctrine from the Persian Gulf War in 1990 to the present and beyond. Historical examples examined include the air campaigns used in the Gulf War, Kosovo crisis, Operations Enduring Freedom, Iraqi Freedom, and the Global War on Terrorism. Oral and written communication skills will be assessed. **PREREQS:** Taken concurrently with AS 220 if fully eligible General Military Course student.

AS 220. LEADERSHIP LABORATORY (1). Cadets are placed in element leadership positions in order to know and comprehend the Air Force concepts of command, discipline, tradition, and courtesies. Lab. Graded P/N. This course is repeatable for a maximum of 3 credits. **PREREQS:** Departmental approval. AS 220 is taken concurrently with AS 211, AS 212, and AS 213. Only offered to students enrolled in the AFROTC officer commissioning program.

AS 299. SPECIAL TOPICS IN AIR FORCE STUDIES (1-16). Supervised individual work. This course is repeatable for a maximum of 99 credits. **PREREQS:** Departmental approval required.

AS 304. FIELD TRAINING (6). Four-week field training (for four-year program students); supplements campus courses in developing leadership and discipline. Mission, organization, and functions of an Air Force base; marksmanship, survival, and physical training; aircrew and aircraft indoctrination; orientation on specific opportunities in career fields. Conducted at an Air Force base. Graded P/N. **PREREQS:** Department head approval required.

AS 306. FIELD TRAINING (6). Five-week field training (for two-year program applicants); education and training comparable to that received by the four-year program cadet during the freshman and sophomore years on campus and the four-week field training period (AS 304). Conducted at an Air Force base. **PREREQS:** Department head approval required.

AS 311. LEADERSHIP FUNDAMENTALS, TEAM BUILDING AND PROBLEM SOLVING (3). Emphasis on leadership and management fundamentals, team building and problem solving. Case studies are used to examine leadership

and management situations as a means of demonstrating and exercising practical application of the concepts being studied. Unique exercises will be utilized to emphasize team building and problem solving. Oral and written communication skills will be assessed. **PREREQS:** Must take concurrently with AS 320 if fully eligible Professional Officer Course student.

AS 312. EFFECTIVE SUPERVISION AND GROUP CONFLICT MANAGEMENT (3). Emphasis on situational leadership, group conflict management, effective supervision, professional knowledge, and communicative skills required of an Air Force officer. Unique case studies on leadership and management situations, and group conflict management will be utilized. Oral and written communication skills will be assessed. **PREREQS:** Taken concurrently with AS 320 if fully eligible Professional Officer Course student.

AS 313. LEADERSHIP, ETHICS, AIR FORCE CORE VALUES AND ACCOUNTABILITY (3). Emphasis on leadership ethics, leadership core values, leadership accountability, and professional knowledge. Unique case studies on leadership ethics and accountability will be utilized. Oral and written communication skills will be assessed. **PREREQS:** Taken concurrently with AS 320 if fully eligible Professional Officer Course Student.

AS 320. LEADERSHIP LABORATORY (1). Cadets are placed in line and staff leadership positions as a preparation for Air Force active duty. Cadet responsibilities include planning, organizing, directing, and controlling the activities of the cadet corps. Lab. Graded P/N. This course is repeatable for a maximum of 3 credits. **PREREQS:** Departmental approval. AS 304 or AS 306. AS 320 is taken concurrently with AS 311, AS 312 and AS 313. Only offered to students enrolled in the AFROTC officer commissioning program.

AS 405. READING AND CONFERENCE (1-16). Supervised individual work. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

AS 411. NATIONAL SECURITY AFFAIRS (3). Emphasis on the needs for national security, evolution of American defense strategy, policy, and organization. Examination of methods for managing conflict, alliances and regional security to preserve American interests. Arms control, terrorism, and current military issues will also be addressed. Refinement of oral and written communication skills will be assessed. **PREREQS:** Taken concurrently with AS 420 if fully eligible Professional Officer Course student.

AS 412. WORLD REGIONAL CULTURAL STUDIES (3). Study key transnational issues and religious or ethnic factors that shape the environment Air Force professionals must operate in. Emphasis will be on national security perspective of Africa, South Asia, East Asia, Latin America, Europe, Middle East and former Soviet Republics in transition. Refinement of oral and written communication skills will be assessed. **PREREQS:** Taken concurrently with AS 420 if fully eligible Professional Officer Course student.

AS 413. PREPARATION FOR ACTIVE DUTY (3). Emphasis on current military issues, evaluation systems, military commission, and operational risk management. Final preparation for the Air Force professional before commissioning. Refinement of oral and written communication skills will be emphasized. **PREREQS:** Taken concurrently with AS 420 if fully eligible Professional Officer Course student.

AS 420. LEADERSHIP LABORATORY (1). The senior-level Leadership Laboratory program places cadets in command, line, and staff positions as a preparation for commissioned Air Force service. Cadet responsibilities include planning, organizing, directing, coordinating, and controlling leadership laboratory and the activities of the cadet corps. Lab. Graded P/N. This course is repeatable for a maximum of 6 credits. **PREREQS:** Departmental approval. AS 304 or AS

306. AS 420 is taken concurrently with AS 411, AS 412 and AS 413. Only offered to students enrolled in the AFROTC officer commissioning program.

MILITARY SCIENCE (AROTC)

LTC Eric Larsen

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FACULTY

Professor LTC Eric Larsen

Assistant Professors Major Jessica Dunn, Captain Marcus Green, Sergeant First Class Hugh Lyon, Mr. Roy Susuico, Mr. David Bolden, Mr. Erin Bagley

Minor

Military Science

The Military Science program is intended for students with the characteristics and attributes of a "scholar-athlete-leader." The program is specifically designed to give college students on-campus instruction and experience in the art of organizing, motivating, and leading others. It includes instruction in leadership to develop self-discipline, physical stamina, and professional bearing.

All courses offered by the Department of Military Science are fully accredited and applicable toward fulfilling academic requirements for graduation. The university offers each eligible student the opportunity to compete for a commission as an officer in the United States Army while earning a college degree. There are both basic and advanced programs with multiple entry points which can be tailored to a student's needs. Merit scholarship opportunities exist for students in any approved academic discipline, particularly in computer science, engineering, math, and science. Uniforms and books are provided free of charge. There are multiple opportunities for cadets to attend funded internships, training with Army units, multi-week trips to foreign countries across the world, Airborne, and Air Assault Training.

BASIC PROGRAM

The basic program is voluntary and is open to all students, comprising the 1- and 2-credit, lower-division courses listed below, and is normally completed during the freshman and sophomore years. Students may also satisfy the advanced program prerequisites or accelerate their progress through previous military experience or by completing MS 214, Military Science: Leader's Training Course (LTC)

(6 credits) held at Fort Knox, Kentucky. No military obligation is incurred for participation in basic program classes, and students can decide whether they want to apply for the advanced program. Additionally, students who only want to attend the lecture portion of the lower-division classes may do so and are not expected to wear uniforms.

ADVANCED PROGRAM

Students who desire to enroll in the two-year advanced program, comprising the 3-credit, upper-division courses listed below, must apply and be accepted. Only those students who have satisfied the basic program requirements described above are eligible.

Students in the advanced program receive \$450 to \$500 per month subsistence allowance during the school year. During the four-week summer Leadership Development Assessment Course (LDAC), they receive room and board, travel expenses to and from the program location, and approximately \$900 for the period involved. Veteran students enrolled in the ROTC program receive these amounts in addition to any other educational benefits.

The LDAC summer program is normally attended between the cadet's junior and senior years. The university awards 6 credits for successful completion.

CAMPUS-BASED SCHOLARSHIP PROGRAM

Each year, the Army ROTC program has dedicated four-, three-, and two-year scholarships awarded to local students attending or planning to attend OSU. Applications are accepted any time during the year. Applicants must meet physical requirements, have a minimum cumulative college GPA of 2.50, SAT score of 920+ or ACT of 19+, no criminal record, and be of good moral character. The scholarship pays full tuition, \$1,200 per year for books, and a stipend of \$300 to \$500 per month while the student is in school. For an application, contact the Department of Military Science at 541-737-3511.

SIMULTANEOUS MEMBERSHIP PROGRAM (SMP)

The Simultaneous Membership Program (SMP) is a voluntary program that allows ROTC students to join the Army National Guard and Army Reserve. Upon graduation from basic training and advanced training, students are eligible for the G.I. Bill, which, combined with tuition assistance, is worth over \$18,000 per year as a full-time student. Upon degree completion, students earn a commission in the active Army, National Guard or Army Reserve.

SERVICE OBLIGATION AND ACADEMIC DELAY

Current laws and regulations require each advanced program graduate to accept a commission upon graduation and to fulfill an eight-year military commitment. This may be satisfied by eight years of reserve forces duty in the USAR or ARNG or by a combination of active duty and reserve forces duty, usually four years active duty and four years reserve forces duty.

Delays in reporting to active duty may also be granted for up to four years to selected students who are enrolled in a full time program of instruction leading to an acceptable advanced degree. No additional service obligation is incurred by this academic delay.

MILITARY SCIENCE MINOR

The Department of Military Science offers a minor which is open to any OSU student. At least 18 of the 27 credits required in the minor must be military science courses.

Military Science (18)

- MS 111. Military Science I: Introduction to Army Leadership and ROTC (1)
- MS 112. Military Science I: Introduction to Basic Military Skills (1)
- MS 113. Military Science I: Introduction to Tactical Leadership (1)
- MS 211. Military Science II: Foundations of Leadership I (2)
- MS 212. Military Science II: Foundations of Leadership II (2)
- MS 213. Military Science II: Fundamentals of Military Operations (2)
- MS 311. Military Science III: Leadership and Management of Military Organization (3)
- MS 312. Military Science III: Leadership and Management of Military Organization (3)
- MS 313. Military Science III: Leadership and Management of Military Organization (3)
- MS 314. Military Science: Leader Development and Assessment Course (6)
- MS 411. Military Science IV: Adaptive Leadership (3)
- MS 412. Military Science IV: Preparation for Officership (3)
- MS 413. Military Science IV: Preparation for Officership (3)

A minimum of one course must be taken from the History list (minimum 3 credits) and two 3-credit courses are required (for a total of 6 credits) from the remaining categories. A student can not use a minor course for this minor that is also part of their major.

History

- HST 317. *Why War? A Historical Perspective (4)
- HST 318. The American Military, 1865–Present (4)
- HST 465. *American Diplomatic History (4)
- MS 405. Reading and Conference (3)

Anthropology

- ANTH 380. *Cultures in Conflict (3)

Communication

- COMM 111. *Public Speaking (3)
- COMM 218. *Interpersonal Communication (3)
- COMM 322. Small-Group Problem Solving (3)
- COMM 446. *Communication in Internal Conflict and Disputes (3)

Peace Studies

- PAX 201. Study of Peace and the Causes of Conflict (3)

Philosophy

- PHL 205. *Ethics (4)
- PHL 344. *Pacifism, Just War, and Terrorism (4)
- PHL 451. Knowledge and Reality (3)

Political Science

- PS 201. *Introduction to United States Government and Politics (4)
- PS 205. *Introduction to International Relations (4)

Total=27

Footnote:

* Baccalaureate Core Course

COURSES

MS 111. MILITARY SCIENCE I: INTRODUCTION TO ARMY LEADERSHIP AND ROTC (1). Introduction to ROTC, and its relationship to the U.S. Army. Role of the army officer, including leadership and management fundamentals. Introduction to land navigation. Lec/lab.

MS 112. MILITARY SCIENCE I: INTRODUCTION TO BASIC MILITARY SKILLS (1). Basic small unit tactics; land navigation; how to read a topographic map and use a magnetic compass; includes practical exercises.

MS 113. MILITARY SCIENCE I: INTRODUCTION TO TACTICAL LEADERSHIP (1). Customs and traditions of the U.S. Army; unit organization and missions. Types of careers available to army officers. Practical exercises. Lec/lab.

MS 130. MILITARY PHYSICAL CONDITIONING (1). Prepares military science cadets and university students to excel on the Army Physical Fitness Test (AFPT). This course is repeatable for a maximum of 11 credits.

MS 211. MILITARY SCIENCE II: FOUNDATIONS OF LEADERSHIP I (2). An examination of effective leadership. Development of interpersonal skills using practical exercises and case studies. Lec/lab.

MS 212. MILITARY SCIENCE II: FUNDAMENTALS OF LEADERSHIP II (2). History of the American soldier from 1775 to 1919; weaponry and tactics of the American Army. Use of battle analysis and war gaming included.

MS 213. MILITARY SCIENCE II: FUNDAMENTALS OF MILITARY OPERATIONS (2). Basic U.S. Army tactics at the individual, team, and squad levels. Integration of military skills in offensive and defensive operations. Lec/lab.

MS 214. MILITARY SCIENCE: LEADER'S TRAINING COURSE (LTC) (6). Four weeks of classroom and field training at Fort Knox, Kentucky. Can substitute for the first two years of the ROTC program. **PREREQS:** Meet minimum enrollment standards for the advanced ROTC program.

MS 311. MILITARY SCIENCE III: LEADERSHIP AND MANAGEMENT OF MILITARY (3). Study of military leadership, management, theory and dynamics of the military team. Applies principles to advanced military operations. Includes leadership, management, and organizational theory; group dynamics; functions of staff organizations; development of the commander's

estimate; combat orders and plans; troop leading procedures; application of leadership concepts in offensive and defensive operations at the squad, platoon, and company level; and fundamentals of small-unit tactics/patrolling. Lec/lab.

MS 312. MILITARY SCIENCE III: LEADERSHIP AND MANAGEMENT OF MILITARY (3). Study of military leadership, management, theory and dynamics of the military team. Applies principles to advanced military operations. Includes leadership, management, and organizational theory; group dynamics; functions of staff organizations; development of the commander's estimate; combat orders and plans; troop leading procedures; application of leadership concepts in offensive and defensive operations at the squad, platoon, and company level; and fundamentals of small-unit tactics/patrolling. Lec/lab.

MS 313. MILITARY SCIENCE III: LEADERSHIP AND MANAGEMENT OF MILITARY (3). Study of military leadership, management, theory and dynamics of the military team. Applies principles to advanced military operations. Includes leadership, management, and organizational theory; group dynamics; functions of staff organizations; development of the commander's estimate; combat orders and plans; troop leading procedures; application of leadership concepts in offensive and defensive operations at the squad, platoon, and company level; and fundamentals of small-unit tactics/patrolling. Lec/lab.

MS 314. MILITARY SCIENCE: LEADER DEVELOPMENT AND ASSESSMENT COURSE (6). Practical and theoretical instruction and training in soldier skills for four weeks. Practical leadership application and experience in a military environment. **PREREQS:** (MS 311 and MS 312 and MS 313)

MS 405. READING AND CONFERENCE (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor approval required.

MS 411. MILITARY SCIENCE IV: ADAPTIVE LEADERSHIP (3). Train, mentor and evaluate underclass cadets. Learn duties and responsibilities of Army staff office and apply processes. Execute and assess battalion training events. Understand and employ risk management process and use soldier fitness program to reduce and manage stress. Lec/lab.

MS 412. MILITARY SCIENCE IV: PREPARATION FOR OFFICERSHIP (3). Recent military history, national defense policy and its application in current world events. Includes military law; law of land warfare; small-unit administration; and ethics and professionalism with emphasis on applied leadership, management techniques, and ethical decision making. Designed to assist the future army officer with the transition from student to junior officer leader. Lec/lab.

MS 413. MILITARY SCIENCE IV: PREPARATION FOR OFFICERSHIP (3). Recent military history, national defense policy and its application in current world events. Includes military law; law of land warfare; small-unit administration; and ethics and professionalism with emphasis on applied leadership, management techniques, and ethical decision making. Designed to assist the future army officer with the transition from student to junior officer leader. Lec/lab.

NAVAL SCIENCE (NROTC)

CAPT Richard K. Wood, II, USN
(US Navy)

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FACULTY

Professor Captain Wood (USN,
Commanding Officer)

Associate Professor Commander
Christensen (USN, Executive Officer)

Assistant Professors Captain Price
(USMC), Lieutenant Fuller (USN),
Lieutenant Gaynor (USN), Lieutenant
Kyler (USN)

Minor

Naval Science

The NROTC program was established to educate and train qualified young men and women for service as commissioned officers in the unrestricted line Naval or Marine Corps Service. As the largest single source of Navy and Marine Corps officers, the NROTC program fills a vital need in preparing mature young men and women for leadership and management positions in an increasingly technical Navy and Marine Corps. NROTC midshipmen compete for selection into various warfare areas: pilot, naval flight officer, submarine officer, surface warfare officer, and special warfare officer. Upon successful completion of the program and graduation from Oregon State University, NROTC midshipmen receive a commission from the president of the United States as an ensign in the U.S. Navy or second lieutenant in the U.S. Marine Corps. The minimum active service requirement upon commissioning is service dependent; it is five years for Navy and four years for the Marines.

NROTC SCHOLARSHIPS

The Navy offers two-year, three-year, and four-year scholarships to qualified students seeking baccalaureate degrees. Students are selected through national competition, and are appointed midshipmen in the United States Naval Reserve by the secretary of the Navy. The Navy provides uniforms and pays tuition, a \$250 per term book stipend, and subsistence allowance of \$250 to \$400 per month depending on the student's undergraduate status. Scholarship students will be required to attend summer training after their freshman, sophomore, and junior years designed to familiarize them with the warfare areas of the Navy and Marine Corps.

To qualify for a national NROTC scholarship you must be a U.S. citizen not less than 17 years old by September 1 of your first year of college and no more than 23 years old that same year. Additionally you must be physically qualified by Naval or Marine Corps standards and have a minimum SAT score of 530 verbal, 520 math or a minimum ACT score of 22 verbal and 22 math. Sophomores not enrolled in the NROTC program can compete nationally for a two-year scholarship by March of their sophomore year. Competitive applicants should have completed three terms of calculus with a grade of C or better and earned a 3.0 cumulative grade-point average or better.

For more information about Naval ROTC scholarship opportunities, visit <http://www.nrotc.navy.mil/> or contact your local Navy-Marine Corps recruiting office. For specific information about OSU NROTC or questions regarding the two-year NROTC scholarships, visit <http://nrotc.oregonstate.edu/> or call the unit at 541-737-5620 or 541-737-6289.

COLLEGE PROGRAM

Students who are not awarded a national scholarship and are accepted to OSU can still participate in Naval ROTC through the college program by applying through the OSU Department of Naval Science. College program midshipmen participate in all aspects of the NROTC program and may be eligible for a scholarship provided they have been active in the program for a minimum of one academic term. To be competitive, a student should not have less than a B (3.0) grade-point average, meet aptitude and physical fitness standards, and receive a favorable recommendation from the professor of naval science. If selected, students receive the same benefits as national scholarship recipients.

College program midshipmen who are not awarded a scholarship must be selected for "advanced standing" status before beginning their junior year to remain in the NROTC program. If selected for "advanced standing" students receive a monthly subsistence allowance of \$350 their junior year and \$400 their senior year. College program midshipmen receive a commission upon graduation and have the same professional opportunities as scholarship midshipmen to select careers in all warfare areas of the Navy and Marine Corps. For specific information about the college program, visit <http://nrotc.oregonstate.edu/> or call the unit at 541-737-5620 or 541-737-6289.

Any university student may take naval science courses for credit. However, such students are classified as naval science students, not enrolled in the NROTC program and are not eligible to take NS 450, At Sea Training.

NAVAL SCIENCE MINOR REQUIREMENTS

NROTC candidates applying for any of the NROTC programs must:

1. be a citizen of the United States or become a citizen before entering the advanced course;
2. be accepted for admission or enrolled in the university;
3. be at least 17 years of age upon enrollment and under 25 years (27 for the college program) on June 30 of the calendar year in which eligible for commissioning;
4. be physically qualified in accordance with the standards established by the Department of the Navy;
5. possess a satisfactory record of moral integrity and have potential officer characteristics;
6. have no moral obligations or personal convictions preventing them from conscientiously bearing arms and supporting and defending the Constitution of the United States against all enemies foreign and domestic.

STATUS AND CURRICULUM

Students enrolled in the NROTC program are not on active duty. They wear the uniform only for drills, on special occasions, and during the summer training periods.

The program of study fits into curricula leading to baccalaureate degrees. Additionally, U.S. Navy-option scholarship students must complete three terms of calculus by the end of their sophomore year and three terms of calculus-based physics by the end of their junior year.

NAVAL SCIENCE MINOR

The Department of Naval Science offers a minor in which the student, including a student not pursuing a commission, may choose between a Navy sequence and a Marine Corps sequence.

A minimum of 30 credits are required for the minor; 18 credits core requirements, and 12 credits from one of the two sequences. Students may elect to have their minor designated on their transcript.

Naval Science Minor Core Requirements (18 credits)

- NS 111. Introduction to Naval Science (3)
 NS 112. U.S. Naval History I (3)
 NS 113. U.S. Naval History II (3)
 NS 211. Leadership and Management (5)
 NS 413. Leadership and Ethics (4)

Navy Sequence (at least 12 credits from list below)

- NS 212. Naval Engineering I (5)
 NS 311. Navigation I (5)
 NS 313. Naval Operations and Seamanship (3)
 NS 411. Naval Weapons Systems (5)

Marine Corps Sequence (12 credits)

- NS 321. Evolution of Warfare I (3)
 NS 322. Evolution of Warfare II (3)
 NS 421. Amphibious Warfare I (3)
 NS 422. Amphibious Warfare II (3)

Total credits = 30

COURSES

NS 111. INTRODUCTION TO NAVAL SCIENCE (3). Naval organization and administration; organization of the Navy or Marine Corps, the Navy and Marine Corps as a career, responsibilities and commitments as an officer in the Navy or Marine Corps.

NS 112. U.S. NAVAL HISTORY I (3). A study of U.S. seapower and maritime affairs from the American Revolution through 1900. Lec/lab. **PREREQS:** NS 112, NS 113 must be taken in order.

NS 113. U.S. NAVAL HISTORY II (3). A study of U.S. seapower and maritime affairs from 1900 through present day. Lec/lab. **PREREQS:** NS 112

NS 211. LEADERSHIP AND MANAGEMENT (5). Overview of the principles, philosophies, and methodologies of effective Naval leadership with emphasis on moral, ethical actions with respect to the principles of authority, responsibility, and accountability as they apply to military organizations.

NS 212. NAVAL ENGINEERING (5). Propulsion, basic engineering systems theory, and concepts application in modern ship and jet propulsion. Course will include auxilliary systems, theory and design of shipboard auxilliaries, ship design, and damage control/safety procedures. Offered every other winter term. **PREREQS:** NS 111 and .

NS 311. NAVIGATION (5). Introduction to navigation including piloting, dead reckoning, and voyage planning. Course includes nautical rules of the road, maneuvering board, relative motion, and shipboard external communications. **PREREQS:** .

NS 313. NAVAL OPERATIONS AND SEAMANSHIP (3). Theory of shiphandling, communications, shipboard evolutions, heavy weather, case study discussions. **PREREQS:** (NS 311 and NS 312)

NS 321. EVOLUTION OF WARFARE I (3). The art and concepts of warfare from the beginning of recorded history to present [the Age of Napoleon]. **PREREQS:** NS 321, NS 322 must be taken in order.

NS 322. EVOLUTION OF WARFARE II (3). The art and concepts of warfare post-WWI (from the beginning of the Industrial Revolution) to present, the current world political situation and U.S. foreign policy and their effects on the Naval services, and forecast for the future. **PREREQS:** NS 321

NS 323. NAVAL SCIENCE III: MARINE CORPS OPTION (3). Preparation for officer candidates school and practical field exercises. For U.S. Marine Corps candidates option. **PREREQS:** NS 322 and /or prior approval required.

NS 405. READING AND CONFERENCE (1-16). To prepare midshipmen returning from a leave of absence from the Naval ROTC program for commissioning and entrance into the fleet. This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor approval required.

NS 411. NAVAL WEAPONS SYSTEMS (5). Introduction to the theory and development of U.S. Naval weapons systems, current weapons systems types, platforms, and employment. Course will include naval weapons systems types, launch platforms, characteristics and employment. **PREREQS:** NS 111

NS 413. LEADERSHIP AND ETHICS (4). Junior Officer administrative responsibilities with emphasis on moral and ethical decision making of Naval leaders. **PREREQS:** NS 211 and approval of Professor of Naval Science required if student has not completed NS 211 with C- or better.

NS 421. AMPHIBIOUS WARFARE I (3). Amphibious warfare from the beginning of recorded history to WW II.

NS 422. AMPHIBIOUS WARFARE II (3). Amphibious warfare post-WW II to present, current world political situation and U.S. foreign policy and their effects on the future of expeditionary warfare.

NS 450. AT-SEA TRAINING (6). Four-week to six-week training cruise taken aboard U.S. Naval ships or submarines as arranged by professor of Naval Science.

One of the largest academic units on campus, with 10 departments and programs, the College of Science offers students undergraduate and graduate degrees in classical disciplines as well as in integrated, cross-disciplinary areas

In addition, the college offers 12 pre-professional programs to prepare students for a career in the medical profession or in science education. The College of Science also teaches basic science courses essential to the education of every student at OSU.

Research and instruction in the College of Science are enhanced by their context within a university of outstanding professional schools in engineering, oceanography, agriculture, forestry, and pharmacy. Science students can enrich their degrees with courses from these areas. They also have opportunities to make original discoveries while working on one of the many research projects under internationally renowned scientists.

MAJORS

The majors of the College of Science are informally divided into the following groups:

Biological Sciences:

Biochemistry and Biophysics, Biology, Microbiology, Molecular and Cellular Biology (graduate only), Zoology.

Physical, Computational, and Mathematical Sciences:

Chemistry, Mathematics, Physics, Statistics (graduate only)

Pre-professional Programs:

General Science

DOUBLE DEGREES IN EDUCATION OR INTERNATIONAL STUDIES OR SUSTAINABILITY

Undergraduates with majors in the College of Science can earn a second degree in education or international studies or sustainability. See the College of Education or International Programs or Department of Forest Ecosystems and Society sections of this catalog for more information.

PRE-PROFESSIONAL PROGRAMS

Special programs in health-related fields are offered by the College of Science to help students meet entrance requirements for professional schools in clinical laboratory science, dentistry, medicine, nursing, occupational therapy, optometry, pharmacy, physical therapy, physician assistant, podiatry, and veterinary medicine.

CURRICULA IN SCIENCE

Curricula in science lead to the degrees of bachelor of arts (BA), bachelor of science (BS), master of arts (MA), master of science (MS), professional science master's (PSM), and doctor of philosophy (PhD). (See the Graduate School for advanced degree requirements.) The college also participates in the Master of Arts in Interdisciplinary Studies (MAIS) program.

TEACHER CERTIFICATION

All professional teacher education occurs in the College of Education. The following majors in the College of Science are suitable for teaching middle school and high school and have a pre-education

option available: biology, chemistry, mathematics, and physics. Students planning to teach in elementary or middle school may use the General Science/Pre-Education option.

Certain mathematics courses (MTH 211, MTH 212, MTH 390) are highly recommended for students who plan to teach elementary or secondary mathematics. See the College of Education section of this catalog for admission to the teacher licensure programs.

SUMMER COURSES FOR SECONDARY SCHOOL SCIENCE AND MATHEMATICS TEACHERS

During the summer session, the College of Science offers a number of courses designed especially for high school teachers of science and/or mathematics. For offerings and full descriptions see the Summer Session website.

SCHOLARSHIPS

The College of Science offers a variety of scholarships to currently enrolled College of Science students who have taken at least 28 credits at OSU. For more information and application forms contact the College of -Science or see <http://www.science.oregonstate.edu/node/108>.

DEGREE REQUIREMENTS

To graduate with a BS degree in the College of Science, undergraduate students must fulfill the following requirements:

University Baccalaureate Core (48)

College of Science Requirements (These credits can also fulfill part of the baccalaureate core requirements.)

- Mathematical sciences (12)
- Physical, earth, and/or biological sciences (15) to include a two-term sequence (At least one term in biological science and one term in physical or earth science. Must include a two-term sequence in one of these sciences.)
- Department requirements (see each department)

Some departments also grant a BA degree that requires a full year of a college-level (200-level or above) foreign language and at least 9 credits of College of Liberal Arts electives in addition to credits required for the baccalaureate core. See the department listings for specific requirements.

DEPARTMENTAL REQUIREMENTS

A minimum 2.00 GPA is required in College of Science majors and minors; (S/U grading is not allowed in science majors or minors).

Mathematics and mathematical sciences degrees have a 2.25 GPA requirement for required upper-division courses.

The curricula are shown for each major; some substitutions can be made with

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department and college approval. Unless otherwise indicated, the conditions and credits for research, thesis, reading and conference, and seminar are to be arranged with the instructor involved.

MANAGEMENT FOR SCIENCE PROFESSIONALS GRADUATE CERTIFICATE

PSM Director
2082 Cordley Hall
Corvallis OR 97331
541-737-5259
Email: kirstin.carroll@oregonstate.edu
Website: <http://psm.science.oregonstate.edu/>

The Management for Science Professionals graduate certificate is designed for individuals in science or science-related fields seeking professional development. Formal training in business management, communication, and ethics allows graduates of this program to broadly communicate with diverse groups of people and move more rapidly into leadership positions within their organizations. This graduate certificate program is ideal for students of professional science tracks like veterinary medicine or pharmacy, current industry or agency employees who want to advance in their careers, or continuing students envisioning careers with future managerial responsibilities.

A graduate certificate is awarded to individuals who complete the professional series of courses (6 courses for 18 credits) offered as part of the Professional Science Master's degree program. If you are not a Professional Science Master's student or enrolled in the graduate certificate program, you can currently only register for these classes through Ecampus. Non-degree seeking students who may later wish to apply to a graduate degree program should be aware that a maximum of 6 credits earned as a non-degree seeking student may be transferred to a graduate certificate or degree program.

Please go to <http://psm.science.oregonstate.edu/graduate-certificate> for additional information and details on how to apply.

Required (18 credits)

COMM 550. Communication and the Practice of Science (3)

PHL 547. Research Ethics (3)

PSM 513. Professional Skills (3)

PSM 565. Accounting and Finance for Scientists (3)

PSM 566. Project Management and Marketing Scientific Technologies (3)

PSM 567. Innovation Management (3)

COURSES

PSM 506. PROJECTS (1 or 16). This course is repeatable for a maximum of 99 credits.

PSM 507. SEMINAR (1-16). This course is repeatable for a maximum of 99 credits.

PSM 513. PROFESSIONAL SKILLS (3). Students will work in teams with off-campus mentors to

address a contemporary problem in a scientific field within the context of an existing business. This collaborative project will provide students with opportunities to integrate and apply their collective knowledge of business management, communication, and science to create innovative solutions. Project management and leadership styles will also be covered, and a final report and presentation are usually required. **PREREQS:** ((COMM 550 or COMM 512) and PHL 547 and PSM 565 and PSM 566 and PSM 567*)

PSM 525. ADVANCED SCIENTIFIC AND TECHNICAL WRITING (4). Combines scientific and technical writing with science journalism. Students will draw on a data set (preferably their own) to draft a scientific journal article, short grant proposal, magazine article, and letter of inquiry. They will also critically evaluate and edit documents by reviewing classmates' drafts. **CROSSLISTED** as WR 525.

PSM 565. ACCOUNTING AND FINANCE FOR SCIENTISTS (3). Students develop business management skills by learning principles of managerial and financial accounting and understanding profit and loss statements, cost analysis, and investment risks. Individuals utilize basic financial tools needed to develop business proposals and successfully manage scientific projects in public and private work sectors.

PSM 566. PROJECT MANAGEMENT AND MARKETING SCIENTIFIC TECHNOLOGIES (3). Students gain an understanding of marketing principles and global markets with a focus on scientific technologies. Project management skills needed to effectively manage diversity, conflict and change in corporate, government and nonprofit environments as well as entrepreneurial ventures will be emphasized. **PREREQS:** PSM 565

PSM 567. INNOVATION MANAGEMENT (3). Students learn about different types of innovation, development and implementation of new technologies, and intellectual property. Student teams develop and present business plans as term projects. Structuring small business enterprises, project planning and management, and commercialization of new products and services prepare individuals for leadership roles in the innovation process. **PREREQS:** (PSM 565 and PSM 566)

PSM 599. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 99 credits.

CHEMISTRY

Rich Carter, Chair

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Website: <http://www.chemistry.oregonstate.edu/>

FACULTY

Professors Barofsky, Carter, Evans, Gable, Ingle, Keszler, Kong, Lerner, Loveland, Nibler, Remcho, Schuyler, Simonich, Sleight, Subramanian, Watson, Westall, White

Associate Professors Blakemore, Loeser, Maier

Assistant Professors Beaudry, Cheong, Fang

Senior Instructors Drapela, Haak, Nafshun, Pastorek, Walker

Instructors Barth, Firpo, Myles, Richardson, Sleszynski, Weiss

ADJUNCT FACULTY

Beckman, Field, Paulenova, Proteau, Tate, Zabriskie

Undergraduate Major

Chemistry (BA, BS, CRED, HBA, HBS)

Track-One Options

Advanced Biochemistry
Advanced Chemistry

Track-Two Options

Biochemistry
Business
Chemistry Education
Chemical Engineering
Environmental Chemistry
Forensic Science
Materials Science
Pre-med

Minor

Chemistry

Graduate Major

Chemistry (MA, MS, PhD)

Graduate Areas of Concentration

Analytical Chemistry
Chemistry
Inorganic Chemistry
Materials Chemistry
Nuclear Chemistry
Organic Chemistry
Physical Chemistry

Graduate Minor

Chemistry

The Department of Chemistry offers BS, BA, MS, MA, MAIS, and PhD degrees in Chemistry. The facilities, faculty, and curricular offerings in this department are approved by the American Chemical Society.

Chemistry provides a gateway to many professions. An undergraduate chemistry degree may serve as preparation for professional work in chemistry and related sciences; as a foundation to pursue applied fields including pharmaceutical chemistry, forensics, biotechnology, medicine, chemical processing, electronics, agricultural and food science, oceanography, marketing of scientific equipment or supplies, environmental sciences, and atmospheric science. It may also serve as a core for pre-professional students pursuing graduate work in pure or applied chemistry, and for those seeking positions as research chemists and technical experts in commercial laboratories and chemical industries, positions in local, state, and federal government facilities, and for postgraduate work leading to teaching positions in universities, colleges, community colleges, and high schools.

There are several degree programs available to undergraduate chemistry majors. All curricula involve general, organic, analytical, physical, and inorganic chemistry course work, plus two to three years of laboratory work in chemistry.

All chemistry majors take part or all of Experimental Chemistry, a six-term laboratory course sequence consisting of 22 project-style experiments. This program replaces the traditional separate divisional laboratory courses in chemistry taught at many universities. Students in this Integrated Laboratory Program work on two to five projects per term, each of which includes components of synthesis, analysis, theory and report writing spanning all areas of modern chemistry. One goal of the program is to provide students intensive hands-on experience in modern chemical instrumentation and computers as a foundation for both graduate studies and employment in science after graduation.

Most chemistry majors take advantage of the opportunity to become involved in research projects in the department. Working with a research group is an exciting way to apply ideas and skills acquired in formal course work. Students work closely with a faculty member and research group to set up their projects. Undergraduates also have the opportunity to present their research as a poster at the annual departmental poster session entitled "Chemistry in Action." Scheduling research time is flexible but three hours of work per week are required per credit. Areas of research available are highly varied and include synthesis of new compounds and materials, development and applications of chemical instrumentation, laser spectroscopy, surface science, reaction mechanisms, design and synthesis of polymers and optical materials, environmental chemistry, bioanalytical methods, and nuclear chemistry. Research experience is helpful when considering graduate work in chemistry and provides valuable experience for entering the job market. Students may also obtain valuable experience and credits for internships.

GRADUATE STUDIES

The Department of Chemistry offers graduate work leading toward Master of Arts, Master of Science, and Doctor of Philosophy degrees in analytical chemistry, inorganic chemistry, nuclear and radiation chemistry, organic chemistry, physical chemistry, and solid state chemistry. The major emphasis of the PhD program is on research. A nonthesis master's degree is available. Most graduate students working on a thesis in chemistry are supported either as graduate teaching assistants or as graduate research assistants.

CHEMISTRY (BA, BS, CRED, HBA, HBS)

BS Degree in Chemistry

The BS degree in Chemistry features two tracks, each with a chemistry core and a selection of accompanying options. Students in either track or any option with good academic records and letters of recommendation will be well prepared and competitive for continued graduate education in chemistry or related areas.

• **Track One** is well suited for students intending to pursue a graduate degree in chemistry or a closely related area. It provides the most rigorous and complete chemistry background and the most extensive laboratory experience. The curriculum is approved by the American Chemical Society (ACS) and has two options: **advanced biochemistry and advanced chemistry**. Both options include 6–12 credits of career-supportive electives (CSE) in advanced chemistry or related disciplines. These CSE courses are approved by the advisor and are intended to strengthen the student's background in areas related to career goals. Students choosing the advanced chemistry option must take at least 3 credits in advanced laboratory courses or research. Track-One graduates are eligible for ACS certification by the department chair and can become full members of the ACS without the requirement of work experience.

• **Track Two** is suited for chemistry majors who want to gain extensive experience in a secondary area, target a particular career direction or continue with graduate education in chemistry or related areas. **Track Two options include: biochemistry, business, chemistry education, chemical engineering, environmental chemistry, forensic science, materials science, and pre-medicine**. The multidisciplinary approach of Track Two enhances preparation and opportunities for employment in electronics, polymers, or biotechnology (the biochemistry, chemical engineering, or materials science options), for careers in environmental science (environmental chemistry option), work in crime labs (forensic science option), or teaching in high schools (chemistry education option). The Track Two curriculum is not approved by the American Chemical Society. It consists of a core of chemistry courses (79–81 credits) and a combination of 8 to 11 courses (30–37 credits) that defines each option.

BA DEGREE IN CHEMISTRY

The BA degree in Chemistry is appropriate for chemistry students interested in obtaining a broader academic background through a second-language requirement and additional liberal arts

courses (9 credits). It also includes 6–12 credits of approved career-supportive electives to allow students to choose courses in advanced chemistry or related disciplines to support their career goals. At least 3 credits are to be in advanced laboratory courses or research. This degree may lead to international opportunities, especially if coupled with the International Degree Program at OSU.

All Undergraduate Chemistry Degrees

The baccalaureate core requirements are met by:

Fitness: HHS 231, plus one HHS course (3)
or any PAC course
Speech (3)
Writing courses (6)
Perspectives courses (12)
One Biology course (4)
One Difference, Power, and Discrimination course (DPD)(3)
Synthesis courses (6)

The quarters in which these are taken are flexible, except that synthesis courses must be taken at the junior and senior level. Chemistry majors or minors may not use S/U grading in courses that meet Department of Chemistry or College of Science requirements.

The timing of courses for all degrees and options can be critical, especially because of prerequisites. More detailed information and suggestions about when to take courses are found on the Chemistry Department website at <http://www.chemistry.oregonstate.edu/>. Students should meet with their advisor every term. For many options in Track Two, students will also be directed to an additional advisor in another department for courses in that option.

For any option involving biochemistry courses, it is strongly recommended that students select:

BI 212. *Principles of Biology (4), as the biology course to fulfill the baccalaureate core requirement.
BI 314. Cell and Molecular Biology (4), is also recommended. Prereqs for BI 314 are BI 211, BI 212, BI 213.

For options in which CH 462, ^Experimental Chemistry II (3), is the recommended WIC course, it is strongly recommended that CH 422, Analytical Chemistry (3), be taken as a corequisite.

Chemistry offers the following courses through the University Honors College (UHC). Chemistry students in the UHC may substitute these courses for courses in the regular sequences:

CH 224H, CH 225H, CH 226H. *Honors General Chemistry (5,5,5)
CH 361H, CH 362H. Experimental Chemistry I (3,3)
and CH 461H. Experimental Chemistry II (3)
and CH 462H, CH 463H, CH 464H.
^Experimental Chemistry II (3,3,3)

Track-One BS Degree in Chemistry
(See the Advanced Biochemistry option and Advanced Chemistry option)

Chemistry Core (76)

CH 231, CH 232, CH 233. *General Chemistry (4,4,4)

and CH 271, CH 272, CH 273.

*Laboratory for CH 231, 232, 233 for Chemistry Majors (1,1,1)

CH 334, CH 335, CH 336. Organic Chemistry (3,3,3)

CH 361, CH 362. Experimental Chemistry I (3,3)

CH 421, CH 422. Analytical Chemistry (3,3)

CH 440, CH 441, CH 442. Physical Chemistry (3,3,3)

MTH 251. *Differential Calculus (4)

MTH 252. Integral Calculus (4)

MTH 253. Infinite Series and Sequences (4) or MTH 306. Matrix and Power Series Methods (4)

MTH 254. Vector Calculus I (4)

PH 211, PH 212, PH 213. *General Physics with Calculus (4,4,4)

PH 221, PH 222, PH 223. Recitation for Physics (1,1,1)

Sample Curriculum

(Track-One BS Degree in Chemistry)

Freshman Year

CH 231, CH 232, CH 233. *General Chemistry (4,4,4)

and CH 271, CH 272, CH 273.

*Laboratory for CH 231, 232, 233 for Chemistry Majors (1,1,1)

HHS 231. *Lifetime Fitness for Health (2)

HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)

or any PAC course (1–2)

MTH 251. *Differential Calculus (4)

MTH 252. Integral Calculus (4)

MTH 254. Vector Calculus I (4)

PH 211, PH 221. *General Physics with Calculus (4,1)

Perspectives courses (6)

Speech (3)

Writing I (3)

Sophomore Year

CH 334, CH 335, CH 336. Organic Chemistry (3,3,3)

CH 361, CH 362. Experimental Chemistry I (3,3)

MTH 253. Infinite Series and Sequences (4) or MTH 306. Matrix and Power Series Methods (4)

Option courses (6 or 7)

PH 212, PH 213. *General Physics (4,4) and PH 222, PH 223. Recitation for Physics (1,1)

Perspectives courses (6)

Writing II (3)

Junior Year

BI 212. *Principles of Biology (4) or BI 102. *General Biology (4)

CH 421, CH 422. Analytical Chemistry (3,3)

CH 440, CH 441, CH 442. Physical Chemistry (3,3,3)

Perspectives and Synthesis courses (6)

Elective and Option courses (18)

Senior Year

Elective and Option courses (42–43)

Synthesis course (3)

Track-Two BS Degree in Chemistry

(See options for Biochemistry, Business, Chemistry Education, Chemical Engineering, Environmental Chemistry, Forensic Science, Materials Science, Pre-Medicine)

Chemistry Core* (79–81)

CH 231, CH 232, CH 233. *General Chemistry (4,4,4)

and CH 271, CH 272, CH 273.

*Laboratory for CH 231, 232, 233 for Chemistry Majors (1,1,1)

CH 324. Quantitative Analysis (4)

(For a stronger background in analytical chemistry, instead of CH 324, plus CH 411 and CH 412, substitute CH 421, CH 422, CH 461, CH 411 or CH 412, which adds 2 credits.)

CH 334, CH 335, CH 336. Organic Chemistry (3,3,3)

CH 361, CH 362. Experimental Chemistry I (3,3)

CH 411, CH 412. Inorganic Chemistry (3,3)

CH 440, CH 441, CH 442. Physical Chemistry (3,3,3)

CH 462. ^Experimental Chemistry II (3)

or CH 463. ^Experimental Chemistry II (3)

or CH 464. ^Experimental Chemistry II (3)

MTH 251, MTH 252, MTH 254. Differential, Integral and Vector Calculus (4,4,4)

PH 211, PH 212, PH 213. *General Physics with Calculus (4,4,4)

and PH 221, PH 222, PH 223. Recitation for Physics 211, 212, 213 (1,1,1)

or PH 201, PH 202, PH 203. *General Physics (5,5,5)

***Note:** For the Chemical Engineering, Environmental Chemistry, Forensic Science, and Materials Science options, the core requirements are slightly modified.

Sample Curriculum (Track-Two BS Degree in Chemistry)

Freshman Year

BI 212. *Principles of Biology (4)

or BI 102. *General Biology (4)

CH 231, CH 232, CH 233. *General Chemistry (4,4,4)

and CH 271, CH 272, CH 273.

*Laboratory for CH 231, 232, 233 for Chemistry Majors (1,1,1)

HHS 231. *Lifetime Fitness for Health (2)

HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)

or any PAC course (1–2)

MTH 251. *Differential Calculus (4)

MTH 252. Integral Calculus (4)

Speech (3)

Writing I (3)

Perspective courses (6)

Electives and Option courses (6)

Sophomore Year

CH 334, CH 335, CH 336. Organic Chemistry (3,3,3)

CH 361, CH 362. Experimental Chemistry I (3,3)

MTH 254. Vector Calculus I (4)

PH 211, PH 212, PH 213. *General Physics (4,4,4)

and PH 221, PH 222, PH 223. Recitation for Physics 211, 212, 213 (1,1,1)

or PH 201, PH 202, PH 203. *General Physics (5,5,5)

Option courses (6)

Perspective course (3)

Writing II (3)

Junior Year

CH 324. Quantitative Analysis (4)

(For a stronger background in analytical chemistry, substitute CH 421, CH 422, and CH 461.)

CH 440, CH 441, CH 442. Physical Chemistry (3,3,3)

CH 462. Experimental Chemistry II (3) or CH 463 or CH 464. ^Experimental Chemistry II (3)

Perspectives and Synthesis courses (6)

Electives and Option courses (20)

Senior Year

CH 411, CH 412. Inorganic Chemistry (3,3)

Synthesis or Perspective courses (6)

Electives and option courses (3,3)

BA DEGREE IN CHEMISTRY

Freshman Year

CH 231, CH 232, CH 233. *General Chemistry (4,4,4)

and CH 271, CH 272, CH 273.

*Laboratory for CH 231, 232, 233 for Chemistry Majors (1,1,1)

HHS 231. *Lifetime Fitness for Health (2)

HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)

or any PAC course (1–2)

MTH 251. *Differential Calculus (4)

MTH 252. Integral Calculus (4)

Perspectives (6)

Speech (3)

Writing I (3)

Electives (10)

Sophomore Year

CH 334, CH 335, CH 336. Organic Chemistry (3,3,3)

CH 361, CH 362. Experimental Chemistry I (3,3)

MTH 254. Vector Calculus (4)

PH 211, PH 212, PH 213. *General Physics (4,4,4)

and PH 221, PH 222, PH 223. Recitation for Physics 211, 212, 213 (1,1,1)

or PH 201, PH 202, PH 203. *General Physics (5,5,5)

Perspectives (6)

Writing II (3)

Electives (3)

Junior Year

BI 211. *Principles of Biology (4)

or BI 101. *General Biology (4)

CH 324. Quantitative Analysis (4)

(For a stronger background in analytical chemistry, instead of CH 324, plus CH 411 and CH 412, substitute CH 421, CH 422, CH 461, CH 411 or CH 412, which adds 2 credits.)

CH 440, CH 441, CH 442. Physical Chemistry (3,3,3)

CH 462. Experimental Chemistry II (3) or CH 463 or CH 464. ^Experimental Chemistry II (3)

Language (first year) (12)

Perspectives and Synthesis courses (6)

Electives (3)

Senior Year

CH 411, CH 412. Inorganic Chemistry (3,3)
 Approved career-supportive electives (9)
(The 9 credits must be approved by the advisor and the department by the end of the winter quarter of the junior year and include 3 credits of lab.)

Synthesis course (3)
 Language (second year) (9–12)
 Electives (15–18)

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

OPTIONS**ADVANCED BIOCHEMISTRY OPTION**

This track-one option leads to a degree approved by the American Chemical Society. It is designed for students continuing their chemistry education in graduate school or seeking careers directly in the chemistry workforce. It provides a rigorous chemistry foundation with extensive laboratory experience. The mix of advanced courses in the option is modified to emphasize biochemistry principles and laboratory techniques.

BB 490, BB 491, BB 492. Biochemistry (3,3,3)
 BB 493. Biochemistry Laboratory (3)
 BB 494. Biochemistry Laboratory (3)
 CH 411. Inorganic Chemistry (3)
 or CH 412. Inorganic Chemistry (3)

Select two courses from the following (6):

CH 461. Experimental Chemistry II (3)
 CH 462. ^Experimental Chemistry II (3)
 CH 463. ^Experimental Chemistry II (3)
 CH 464. ^Experimental Chemistry II (3)

Select 6 credits (courses approved by the advisor by the end of the winter quarter of the junior year):

Career-supportive electives (CSE) (6)

Total=33

Footnote:

^ Writing Intensive Course (WIC)

ADVANCED CHEMISTRY OPTION

This track-one option leads to a degree approved by the American Chemical Society. Designed for students continuing their chemistry education in graduate school or seeking careers directly in the chemistry workforce. This provides the most rigorous and complete chemistry foundation with the most extensive laboratory experience. Undergraduate research is strongly encouraged. Knowledge and skills are developed in organic, analytical, physical and inorganic chemistry. Six advanced laboratory courses are required. Students have a choice of electives that support their career goals.

BB 450. General Biochemistry (4)
 or BB 490 and BB 491. Biochemistry (3,3)
 CH 411, CH 412. Inorganic Chemistry (3,3)
 CH 461. Experimental Chemistry II (3)
 CH 462, CH 463, CH 464. ^Experimental Chemistry II (3,3,3)

MTH 256. Applied Differential Equations (4)
 or MTH 341. Linear Algebra (3)

Select 12 credits (courses approved by the advisor by the end of the winter quarter of the junior year; must include 3 credits of upper-division lab, with CH 401 or CH 403 strongly recommended).

Career-supportive electives (CSE) (12)

Note: BB 491, Biochemistry (3), fulfills 2 credits of Career Supported Electives if taken with BB 490, Biochemistry (3).

Total=36–38

BIOCHEMISTRY OPTION

The Biochemistry option is for students interested in working in biotechnology areas. Students can earn a BS degree in Chemistry in four years while targeting a career direction in biotechnology or preparing for graduate studies in chemistry. This option includes nine courses in biology, biochemistry including lab, and genetics and molecular biology.

The Biochemistry option is designed for the Track-Two BS degree in Chemistry.

BB 490, BB 491, BB 492. Biochemistry (3,3,3)

Select two courses from the following:

BB 493. Biochemistry Laboratory (3)
 BB 494. Biochemistry Laboratory (3)

Plus:

BI 212, BI 213. *Principles of Biology (4,4)
 BI 311. Genetics (4)
 BI 314. Cell and Molecular Biology (4)

Total=31

BUSINESS OPTION

The Business option is designed for chemists interested in, for example, opening a small business, working in sales and marketing, or as preparation for entering the MBA program at OSU¹. Students earn a BS degree in Chemistry in four years and can also fulfill course work required as part of the minor in Business and Entrepreneurship². This option is also a good stepping stone for law school or graduate studies in chemistry. The option includes six courses in accounting, law, finance, organizational systems.

The Business option is designed for the Track-Two BS degree in Chemistry.

Required (27–28 credits)

BA 215. Fundamentals of Accounting (4)
 BA 260. Introduction to Entrepreneurship (4)
 BA 351. Managing Organizations (4)
 BA 360. Introduction to Financial Management (4)
 BA 390. Marketing (4)
 ECON 201. *Introduction to Microeconomics (4)
 ST 314. Introduction to Statistics for Engineers (3)
 or ST 351. Introduction to Statistical Methods (4)

Required Electives (4 credits)

Select one course from among the three following suggested sets:

Suggested for emphasis in small business:

BA 362. Social Entrepreneurship and Social Initiatives (4)
 BA 363. Technology and Innovation Management (4)
 BA 460. Venture Management (4)

OR**Suggested for emphasis in sales and marketing:**

BA 491. Personal Selling (4)

OR**Suggested for MBA preparation:**

BA 357. Operations Management (4)³

Total=31–32

Footnotes:

¹ Students who complete these business courses and some additional courses may apply upon graduation to the OSU College of Business to be accepted into a 45-credit, three-term MBA program. All students serious about pursuing an OSU MBA should make an appointment with the College of Business MBA advisor, 541-737-3716, <http://www.business.oregonstate.edu/mba>. Students should also take BA 211, Financial Accounting (4) and BA 213, Managerial Accounting (4) at the undergraduate level.

² There are additional requirements for the minor in Business and Entrepreneurship. For example, the minor also requires an orientation course, GPA requirements, and academic residency requirements. You are advised to meet with an advisor in the College of Business.

³ BA 357 requires a special override from an advisor in the COB because chemistry majors substitute ST 351 or ST 314 for BA 276.

CHEMICAL ENGINEERING OPTION

The Chemical Engineering option offers selected chemical engineering concepts that may enhance career opportunities in areas such as electronics, polymers, and biotechnology, or prepare students for graduate studies in chemistry or related fields. Students can earn a BS degree in Chemistry in four years while targeting a career direction. This option includes nine courses in basic engineering and chemical engineering including mass and fluid transport, reaction engineering, and separations processes.

The Chemical Engineering option is designed for the Track-Two BS degree in Chemistry.

The track-two core requirements are slightly modified for the Chemical Engineering option:

Required/Recommended for Core:

PH 211, PH 212, PH 213. *General Physics with Calculus (4,4,4) *Required*
 CH 462. ^Experimental Chemistry II (3) *Recommended*

Chemical Engineering**Option Requirements**

CHE 211. Material Balances and Stoichiometry (4)
 CHE 212. Energy Balances (4)
 CHE 411. Mass Transfer Operations (4)
 CHE 443. Chemical Reaction Engineering (4)
 ME 331. Introductory Fluid Mechanics (4)
 ME 332. Heat Transfer (4)
 MTH 256. Applied Differential Equations (4)

Select one course from below for 3–4 credits:

CH 401. Research (3)
 or CHE 401. Research (3)
 CHE 213. Process Analysis (4)
 CHE 311. Thermodynamics (3)
 CHE 312. Chemical Engineering Thermodynamics (3)
 CHE 331. Transport Phenomena I (4)
 CHE 332. Transport Phenomena II (3)
 CHE 361. Chemical Process Dynamics and Simulation (3)
 CHE 444. Thin Film Materials Processing (4)
 CHE 445. Polymer Engineering and Science (4)
 or ENGR 213. Strength of Materials (3)
 CHE 461. Process Control (3)
 ENGR 321. Materials Science (3)

Total=33–34**CHEMISTRY EDUCATION OPTION**

The Chemistry Education option is directed at students planning to teach high school chemistry or continuing on with graduate education and teaching careers at community colleges. Students can earn a BS degree in Chemistry in four years and obtain experience that can be useful when applying for the Master of Science in Science Education from OSU. This option includes 11 courses covering teaching methods, a secondary area, and undergraduate teaching internship and seminar in chemistry.

The Chemistry Education option is designed for the Track-Two BS degree in Chemistry.

CH 407. Chemistry Teaching Seminar (1)
 CH 410. Undergraduate Teaching Internship (3)
 PSY 202. *General Psychology (3)
 SED 409. Field Practicum: Science and Mathematics (3)
 SED 412. Technology Foundations for Teaching Math and Science (3)
 SED 413. Inquiry in Science and Science Education (3)
 Second Endorsement electives (15)

Select one elective course from list below for 3 credits:

PSY 350. Human Lifespan Development (3)
 SED 414. Inquiry in Mathematics and Mathematics Education (3)
 TCE 216. Purpose, Structure, and Function of Education in a Democracy (3)
 TCE 253. Learning Across the Lifespan (3)

Note: Courses in the second endorsement area are to be from a list approved by the College of Education and must be different from those required in the

chemistry core. The courses in this option are designed to interface with the Professional Teacher Master of Science Education program for prospective high school teachers through the College of Education at OSU.

Total=34**ENVIRONMENTAL CHEMISTRY OPTION**

The Environmental Chemistry option is structured to provide a quality foundation for working in government, industrial or university labs studying the behavior of chemicals in the environment. It also is suited to graduate education in chemistry or environmental chemistry. Students can earn a BS degree in Chemistry in four years while targeting their career. This option includes 11 courses in biology, microbiology, toxicology, environmental chemistry and health, soil science, and hydrology.

The Environmental Chemistry option is designed for the Track-Two BS degree in Chemistry.

The track-two core requirements are slightly modified for the Environmental Chemistry option:

Required for Core:**Replace CH 324 with:**

CH 421, CH 422. Analytical Chemistry (3,3)
 and CH 461. Experimental Chemistry II (3)

Only one term of inorganic chemistry:

CH 411. Inorganic Chemistry (3)
 or CH 412. Inorganic Chemistry (3)

Requirements

BI 212, BI 213. *Principles of Biology (4,4)
 BI 314. Cell and Molecular Biology (4)
 MB 302, MB 303. General Microbiology and Lab (3,2)
 ST 201. Principles of Statistics (4)
 or ST 314. Introduction to Statistics for Engineers (3)
 TOX 430. Chemical Behavior in the Environment (3)
 TOX 455. Ecotoxicology: Aquatic Ecosystems (3)

Select three courses from below for 9–10 credits:

BI 211. *Principles of Biology (4)
 BI 370. Ecology (3)
 CE 514. Groundwater Hydraulics (3)
 CH 401. Research (3)
 CH 692. Environmental Transformation of Organic Compounds (3)
 CSS 305. Principles of Soil Science (4)
 [Taught at EOU LaGrande campus only.]
 or SOIL 205. *Soil Science (4)
 CSS/SOIL 535. Soil Physics (3)
 CSS/SOIL 545. Geochemistry of Soil Ecosystems (4)
 ENVE 531. Fate and Transport of Chemicals in Environmental Systems (4)
 ENVE 532. Aqueous Environmental Chemistry (4)
 ENVE 541. Microbial Processes in Environmental Systems (4)
 GEO 487. Hydrogeology (4)
 H 412. Air Quality and Public Health (3)

TOX 413/TOX 513. Environmental Toxicology and Risk Assessment (3)
 TOX 490/TOX 590. Environmental Forensic Chemistry (3)

Total=35–36**FORENSIC SCIENCE OPTION**

The Forensic Science option is appropriate for students interested in working in a crime lab or pursuing a graduate degree in forensic science or chemistry. Students can earn a BS degree in Chemistry in four years and also take a combination of courses that enhance a chemistry major's background in biology, biochemistry, and related areas that can be important in forensic science.

The Forensic Science option is designed for the Track-Two BS degree in Chemistry.

The track-two core requirements are slightly modified for the Forensic Science option as follows:

Required for Core:**Replace CH 324 with:**

CH 421, CH 422. Analytical Chemistry (3,3)
 CH 461. Experimental Chemistry II (3)

Only one term of inorganic chemistry:

CH 411. Inorganic Chemistry (3)
 or CH 412. Inorganic Chemistry (3)

Requirements

BI 212, BI 213. *Principles of Biology (4,4)
 BI 314. Cell and Molecular Biology (4)
 BB 450, BB 451. General Biochemistry (4,3)
 or BB 490 and BB 491. Biochemistry (3,3)
 BB 494. Biochemistry Laboratory (3)
 TOX 411/TOX 511. Fundamentals of Toxicology (3)

Select three courses from below for 7–12 credits

BB 492. Biochemistry (3)
 BI 311. Genetics (4)
 CH 401. Research (3)
 CH 410. Internship (2-3)
 CH 424. Bioanalytical Chemistry (3)
 CH 661. Separations: Chromatography and Related Methods (3)
 CH 692. Environmental Transformation of Organic Compounds (3)
 CH 697. Mass Spectroscopy of Organic Compounds (3)
 MB 302. General Microbiology (3)
 MB 303. General Microbiology Lab (2)
 ST 201. Principles of Statistics (4)
 or ST 351. Introduction to Statistical Methods (4)
 TOX 490/TOX 590. Environmental Forensic Chemistry (3)

Z 331. Human Anatomy and Physiology (3)
 Z 341. Human Anatomy and Physiology Lab (2)

Total=31–37**MATERIALS SCIENCE OPTION**

The Materials Science option is customized to include applied courses in a variety of materials areas to enhance career opportunities in, for example, electronics, polymers and biotechnology. Stu-

dents can earn a BS degree in Chemistry in four years while targeting a career in this field or preparing for graduate school in chemistry or related areas.

The Materials Science option is designed for the Track-Two BS degree in Chemistry.

The track-two core requirements are slightly modified for the Materials Science option:

Required/Recommended for Core:
PH 211, PH 212, PH 213. *General Physics with Calculus (4,4,4) *Required*

Requirements

CH 445. Physical Chemistry of Materials (3) or ENGR 321. Material Science (3)

CHE 444. Thin-Film Materials Processing (3)
CHE 445. Polymer Engineering and Science (4)

ENGR 322. Mechanical Properties of Materials (4)

MTH 256. Applied Differential Equations (4)

Select four courses from below for 12–14 credits:

CH 401. Research (3)

CH 413. Solid State Chemistry (3–4)

CHE 401. Research (3)

ECE 416. Electronic Materials and Devices (4)

ENGR 211. Statics (3)

ENGR 212. Dynamics (3)

ENGR 213. Strength of Materials (3)

ENGR 221. The Science, Engineering, and Social Impact of Nanotechnology (3)

ME 316. Mechanics of Materials (3)

PH 475. Introduction to Solid State Physics (3)

WSE 318. Mechanical Behavior of Wood (4)

Total=27–29

PRE-MEDICINE OPTION

The Pre-Medicine option is directed at students planning to apply to medical or dental school who also wish to target chemistry as a career pathway. A degree in chemistry provides a strong foundation for many professions and post-graduate degrees in chemistry or related areas. Students can earn a BS degree in Chemistry in four years while also taking Pre-Medicine option courses in biology, biochemistry, and related areas that are important components for application to medical school.

The Pre-Medicine option is designed for the Track-Two BS degree in Chemistry.

Required

BB 450, BB 451. General Biochemistry (4,3) or BB 490, BB 491. Biochemistry (3,3)

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

BI 311. Genetics (4)

BI 314. Cell and Molecular Biology (4)

PHL 444. Biomedical Ethics (4)

ST 351. Introduction to Statistical Methods (4)

Total=34–35

CHEMISTRY MINOR

Also available via Ecampus.

The requirements for a minor in Chemistry include a minimum of 27 credits of chemistry (CH) courses.

Choose one of the following complete general chemistry sequences:

1. CH 121, *CH 122, *CH 123. General Chemistry (5,5,5)
2. CH 231, CH 232, CH 233. *General Chemistry (4,4,4) **and** CH 271, CH 272, CH 273. *Laboratory for CH 231, 232, 233 for Chemistry Majors (1,1,1)
3. CH 224H, CH 225H, CH 226H. *Honors General Chemistry (5,5,5)
4. CH 201, CH 202. Chemistry for Engineering Majors (3,3) **and** CH 205. Laboratory for Chemistry 202 (1) **and** CH 123. *General Chemistry (5)
5. CH 201, CH 202. Chemistry for Engineering Majors (3,3) **and** CH 205. Laboratory for Chemistry 202 (1) **and** CH 223. *General Chemistry (5)

In addition, a minimum of four upper-division courses of 3 or more credits in at least two areas of chemistry (organic, physical, analytical, inorganic, or nuclear) and including one laboratory course are required. All courses must be taken for a grade (not S/U) and the overall GPA for all chemistry courses must be 2.0 or higher.

Courses that cannot be used for the minor:

Biochemistry Courses

CH 130. General Chemistry of Living Systems (4)

CH 374. *Technology, Energy, and Risk (3)

CH 401/501/601. Research (1–16)

CH 403/503/603. Thesis (1–16)

CH 407/507/607. Seminar (1–16)

CH 410/510/610. Internship (1–16)

CH 695. Electronics for Scientists (4)

CH 696. Computer Interfacing (4)

See <http://chemistry.oregonstate.edu/node/1727> for more details about the Chemistry minor.

CHEMISTRY (MA, MS, PhD)

Graduate Areas of Concentration
Analytical chemistry, inorganic chemistry, materials chemistry, nuclear chemistry, organic chemistry, physical chemistry

The Department of Chemistry offers graduate work leading toward Master of Arts, Master of Science, and Doctor of Philosophy degrees in Chemistry with concentrations in analytical chemistry, inorganic chemistry, nuclear chemistry, organic chemistry, physical chemistry and solid state chemistry.

All students are required, early in their graduate study, to take a series of graduate courses in their major area. For the PhD, the required written preliminary examinations take the form of a number of “cumulative examinations.” Exceptions to this include the concentration

in nuclear chemistry, which requires only a single written examination, and concentrations in inorganic chemistry, solid state chemistry or physical chemistry, which require only an oral exam. For each field there is a list of courses representing subject matter in which competence is required of those electing that field for PhD work, but the major emphasis of the PhD program is in research rather than formal courses. All degrees require a research thesis except for the Master of Science nonthesis degree. There is no departmental requirement of a foreign language. Most graduate students in chemistry are supported either as graduate teaching assistants or as graduate research assistants.

CHEMISTRY GRADUATE MINOR

For more details, see the departmental advisor.

COURSES

CH 121. GENERAL CHEMISTRY (5). A general chemistry sequence for students who have had no previous training in chemistry and for those whose college aptitude test scores indicate the need for a more elementary introduction to chemistry. Entering students are expected to have a working knowledge of high school algebra, logarithms, and scientific notation. Lec/lab/rec. (CH 122, CH 123 are Bacc Core Courses) **PREREQS:** CH 121, CH 122, CH 123 must be taken in order.

CH 122. *GENERAL CHEMISTRY (5). A general chemistry sequence for students who have had no previous training in chemistry and for those whose college aptitude test scores indicate the need for a more elementary introduction to chemistry. Entering students are expected to have a working knowledge of high school algebra, logarithms, and scientific notation. Lec/lab/rec. (CH 122 and CH 123 are Bacc Core courses.) **PREREQS:** ((CH 121 or CH 201 or CH 221) or ((CH 231 or CH 231H) and (CH 261 or CH 261H or CH 271)) and CH 121, CH 122, CH 123 must be taken in order.

CH 123. *GENERAL CHEMISTRY (5). A general chemistry sequence for students who have had no previous training in chemistry and for those whose college aptitude test scores indicate the need for a more elementary introduction to chemistry. Entering students are expected to have a working knowledge of high school algebra, logarithms, and scientific notation. Lec/lab/rec. (CH 122 and CH 123 are Bacc Core courses.) **PREREQS:** (CH 122 or CH 222 or ((CH 232 or CH 232H) and (CH 262 or CH 262H or CH 272)) or (CH 202 and CH 205) and CH 121, CH 122, CH 123 must be taken in order.

CH 130. GENERAL CHEMISTRY OF LIVING SYSTEMS (4). Introduction to organic chemistry and the chemistry of biological systems. Organic nomenclature and fundamental reactions, emphasizing topics such as amino acids, proteins, biochemical energy, and nucleic acids (DNA and RNA). Intended as a terminal course in chemistry, not to serve as a prerequisite to higher numbered chemistry courses. Lec/lab. Does not count toward a chemistry minor.

CH 140. GENERAL, ORGANIC, AND BIOLOGICAL CHEMISTRY (6). An introduction to general, organic, and biological chemistry. Intended as a terminal course in chemistry, not to serve as a prerequisite to higher numbered chemistry courses. Offered via Ecampus only. **PREREQS:** Entering students are expected to have a working knowledge of high school algebra, logarithms, and scientific notation.

CH 199. SPECIAL TOPICS (1-3). This course is repeatable for a maximum of 3 credits.

PREREQS: Departmental approval required.

CH 201. CHEMISTRY FOR ENGINEERING MAJORS (3). A sequence of selected chemistry topics for pre-engineering students. Lec.

PREREQS: MTH 111 or MTH 112 or (MTH 251 or MTH 251H). CH 201 and CH 202 must be taken in order.

CH 202. CHEMISTRY FOR ENGINEERING MAJORS (3). A sequence of selected chemistry topics for pre-engineering students. Lec.

PREREQS: (CH 121 or CH 201 or CH 221 or ((CH 231 or CH 231H) and (CH 261 or CH 261H or CH 271)) or CH 224H) and CH 201 and CH 202 must be taken in order.

CH 205. LABORATORY FOR CHEMISTRY 202 (1). Three-hour weekly session for the development

of laboratory skills in general chemistry for engineers. Lec/lab. **PREREQS:** CH 202*

CH 211. RECITATION FOR CHEMISTRY 201 (1). 80-minute weekly session for the development

of problem-solving skills in general chemistry for engineers. Rec. **COREQS:** CH 201

CH 212. RECITATION FOR CHEMISTRY 202 (1). One-hour weekly session for the development

of problem-solving skills in general chemistry for engineers. Rec. **COREQS:** CH 202

CH 220. CAREERS IN CHEMISTRY (1). Course

for chemistry majors that discusses strategies for success in the study of chemistry and the varied career opportunities available. Topics range from surviving freshman chemistry to choices of advanced classes, study abroad opportunities, internships, getting into and succeeding in graduate school, choices of chemical careers in academia, industry, government, non-governmental organizations, and using chemistry as a foundation for careers in other areas such as law and business. Graded P/N.

CH 231. GENERAL CHEMISTRY (4). A general

chemistry sequence for students majoring in most sciences, pharmacy, and chemical engineering. CH 231 is a lecture course; CH 261 is the laboratory component. Lec/rec. (Bacc Core Course if taken with CH 261) **PREREQS:** (CH 261* or CH 271*) and one year of high school chemistry and acceptable aptitude test scores. CH 121 is accepted in lieu of high school chemistry as a prerequisite for this sequence. CH 231, CH 232, CH 233 must be taken in order.

CH 231H. GENERAL CHEMISTRY (4). A general

chemistry sequence for students majoring in most sciences, pharmacy, and chemical engineering. CH 231H is a lecture course; CH 261H is the laboratory component. Lec/rec. (Bacc Core Course if taken with CH 261H) **PREREQS:** (CH 261H* or CH 271H*) and one year of high school chemistry and acceptable aptitude test scores. CH 121 is accepted in lieu of high school chemistry as a prerequisite for this sequence. CH 231H, CH 232H, CH 233H must be taken in order. Honors College approval required.

CH 232. GENERAL CHEMISTRY (4). A general

chemistry sequence for students majoring in most sciences, pharmacy, and chemical engineering. CH 232 is a lecture course; CH 262 is the laboratory component. Lec/rec. (Bacc Core Course if taken with CH 262) **PREREQS:** ((CH 231 or CH 231H or CH 221) and (CH 262* or CH 272*)) and one year of high school chemistry and acceptable aptitude test scores. CH 121 is accepted in lieu of high school chemistry as a prerequisite for this sequence. CH 231, CH 232, CH 233 must be taken in order.

CH 232H. GENERAL CHEMISTRY (4). A general

chemistry sequence for students majoring in most sciences, pharmacy, and chemical engineering. CH 232H is a lecture course; CH 262H is the laboratory component. Lec/rec. (Bacc Core Course) **PREREQS:** ((CH 231 or CH 231H or CH 221 or CH 224H) and (CH 262H* or CH 272H*)) and one year of high school chemistry

and acceptable aptitude test scores. CH 121 is accepted in lieu of high school chemistry as a prerequisite for this sequence. CH 231H, CH 232H, CH 233H must be taken in order. Honors College approval required.

CH 233. GENERAL CHEMISTRY (4). A general

chemistry sequence for students majoring in most sciences, pharmacy, and chemical engineering. CH 233 is a lecture course; CH 263 is the laboratory component. Lec/rec. (Bacc Core Course if taken with CH 263) **PREREQS:** ((CH 232 or CH 232H or CH 222 or CH 225H) and (CH 263* or CH 263H* or CH 273* or CH 273H*)) and one year of high school chemistry and acceptable aptitude test scores. CH 121 is accepted in lieu of high school chemistry as a prerequisite for this sequence. CH 231, CH 232, CH 233 must be taken in order.

CH 233H. GENERAL CHEMISTRY (4). A general

chemistry sequence for students majoring in most sciences, pharmacy, and chemical engineering. CH 233H is a lecture course; CH 263H is the laboratory component. Lec/rec. (Bacc Core Course if taken with CH 263H) **PREREQS:** ((CH 232 or CH 232H or CH 222 or CH 225H) and (CH 263* or CH 263H* or CH 273* or CH 273H*)) and one year of high school chemistry and acceptable aptitude test scores. CH 121 is accepted in lieu of high school chemistry as a prerequisite for this sequence. CH 231H, CH 232H, CH 233H must be taken in order. Honors College approval required.

CH 261. *LABORATORY FOR CHEMISTRY 231 (1). A general chemistry laboratory sequence

for students majoring in most sciences, pharmacy, and chemical engineering. (Bacc Core Course if taken with CH 231) **COREQS:** CH 231

CH 261H. *LABORATORY FOR CHEMISTRY 231H (1). A general chemistry laboratory sequence

for students majoring in most sciences, pharmacy, and chemical engineering. (Bacc Core Course if taken with CH 231H) **PREREQS:** Honors College approval required. **COREQS:** CH 231H

CH 262. *LABORATORY FOR CHEMISTRY 232 (1). A general chemistry laboratory sequence

for students majoring in most sciences, pharmacy, and chemical engineering. (Bacc Core Course if taken with CH 232) **PREREQS:** CH 261 or CH 261H or CH 271 or CH 271H or CH 221 or CH 224H **COREQS:** CH 232

CH 262H. *LABORATORY FOR CHEMISTRY 232H (1). A general chemistry laboratory sequence

for students majoring in most sciences, pharmacy, and chemical engineering. (Bacc Core Course if taken with CH 232H) **PREREQS:** CH 261 or CH 261H or CH 271 or CH 271H or CH 221 or CH 224H and Honors College approval required. **COREQS:** CH 232H

CH 263. *LABORATORY FOR CHEMISTRY 233 (1). A general chemistry laboratory sequence

for students majoring in most sciences, pharmacy, and chemical engineering. (Bacc Core Course if taken with CH 233) **PREREQS:** CH 262 or CH 262H or CH 272 or CH 272H or CH 222 or CH 225H **COREQS:** CH 233

CH 263H. *LABORATORY FOR CHEMISTRY 233H (1). A general chemistry laboratory sequence

for students majoring in most sciences, pharmacy, and chemical engineering. (Bacc Core Course if taken with CH 233H) **PREREQS:** CH 262 or CH 262H or CH 272 or CH 272H or CH 222 or CH 225H and Honors College approval required. **COREQS:** CH 233H

CH 271. *LABORATORY FOR CH 231 FOR CHEMISTRY MAJORS (1). A general chemistry

laboratory sequence for students majoring in chemistry. (Bacc Core Course if taken with CH 231) **COREQS:** CH 231

CH 271H. *LABORATORY FOR CH 231H FOR CHEMISTRY MAJORS (1). A general chemistry

laboratory sequence for students majoring in chemistry. (Bacc Core Course if taken with CH 231H) **PREREQS:** Honors College approval required. **COREQS:** CH 231H

CH 272. *LABORATORY FOR CH 232 FOR CHEMISTRY MAJORS (1). A general chemistry laboratory sequence for students majoring in chemistry. (Bacc Core Course if taken with CH 232) **PREREQS:** CH 271 or CH 271H or CH 221 or CH 224H **COREQS:** CH 232

CH 272H. *LABORATORY FOR CH 232H FOR CHEMISTRY MAJORS (1). A general chemistry

laboratory sequence for students majoring in chemistry. (Bacc Core Course if taken with CH 232H) **PREREQS:** CH 271 or CH 271H or CH 221 or CH 224H and Honors College approval required. **COREQS:** CH 232H

CH 273. *LABORATORY FOR CH 233 FOR CHEMISTRY MAJORS (1). A general chemistry

laboratory sequence for students majoring in chemistry. (Bacc Core Course if taken with CH 233) **PREREQS:** CH 272 or CH 272H or CH 222 or CH 225H **COREQS:** CH 233

CH 273H. *LABORATORY FOR CH 233H FOR CHEMISTRY MAJORS (1). A general chemistry

laboratory sequence for students majoring in chemistry. (Bacc Core Course if taken with CH 233H) **PREREQS:** CH 272 or CH 272H or CH 222 or CH 225H and Honors College approval required. **COREQS:** CH 233H

CH 324. QUANTITATIVE ANALYSIS (4). A

basic course in modern chemical analysis. Self-paced laboratory. CH 130 does not meet the prerequisites for this course. **PREREQS:** (CH 123 or CH 223 or CH 226H or ((CH 233 or CH 233H) and (CH 263 or CH 263H or CH 273)) and /or one year of general chemistry or instructor approval.

CH 331. ORGANIC CHEMISTRY (4). Service

course covering aliphatic and aromatic chemistry. Introduction to nomenclature, mechanism and synthesis. Lec/rec. CH 130 does not meet the prerequisites for this course. **PREREQS:** (CH 123 or CH 223 or CH 226H or ((CH 233 or CH 233H) and (CH 263 or CH 263H or CH 273)) and one year of general chemistry or instructor approval. CH 331 and CH 332 must be taken in order.

CH 332. ORGANIC CHEMISTRY (4). Service

course covering aliphatic and aromatic chemistry. Introduction to nomenclature, mechanism and synthesis. Lec/rec. **PREREQS:** CH 331 and one year of general chemistry.

CH 334. ORGANIC CHEMISTRY (3). Professional

course for majors in chemistry, biochemistry, chemical engineering and other students who need a year of organic chemistry. In-depth treatment of major classes of organic compounds. Interrelation of mechanistic and synthetic approaches. **PREREQS:** (CH 123 or CH 223 or CH 226H or ((CH 233 or CH 233H) and (CH 263 or CH 263H or CH 273)) and one year general chemistry or instructor approval. CH 130 does not meet the prerequisites for this course.

CH 335. ORGANIC CHEMISTRY (3). Professional

course for majors in chemistry, biochemistry, chemical engineering and other students who need a year of organic chemistry. In-depth treatment of major classes of organic compounds. Interrelation of mechanistic and synthetic approaches. **PREREQS:** CH 334 and one year general chemistry.

CH 336. ORGANIC CHEMISTRY (3). Professional

course for majors in chemistry, biochemistry, chemical engineering and other students who need a year of organic chemistry. In-depth treatment of major classes of organic compounds. Interrelation of mechanistic and synthetic approaches. **PREREQS:** CH 335 and one year of general chemistry.

CH 337. ORGANIC CHEMISTRY LABORATORY (4). Laboratory course in organic chemistry for

nonmajors, designed to supplement CH 331, CH 332 and CH 334, CH 335, CH 336. Lec/lab. **PREREQS:** (CH 331 and CH 332) or (CH 334 and CH 335 and CH 336)

CH 361. EXPERIMENTAL CHEMISTRY I (3).

First term of integrated laboratory program

for chemistry majors highlighting techniques in organic, physical, and analytical chemistry. First-hand experience is gained using specialized glassware, scientific equipment and instrumentation plus computers. Essential technical laboratory standards and technical writing are emphasized. Lec/lab. **PREREQS:** ((CH 221 and CH 222 and CH 223) or (CH 224H and CH 225H and CH 226H) or ((CH 231 or CH 231H) and (CH 261 or CH 261H or CH 271) and (CH 232 or CH 232H) and (CH 262 or CH 262H or CH 272) and (CH 233 or CH 233H) and (CH 263 or CH 263H or CH 273)) and (MTH 251* or MTH 251H*) and (PH 201* or PH 211*) and CH 334*) and departmental approval required. Restricted to chemistry and biochemistry/biophysics majors.

CH 361H. EXPERIMENTAL CHEMISTRY I (3). First term of integrated laboratory program for chemistry majors highlighting techniques in organic, physical, and analytical chemistry. First-hand experience is gained using specialized glassware, scientific equipment and instrumentation plus computers. Essential technical laboratory standards and technical writing are emphasized. Lec/lab. **PREREQS:** ((CH 221 and CH 222 and CH 223) or (CH 224H and CH 225H and CH 226H) or ((CH 231 or CH 231H) and (CH 261 or CH 261H or CH 271) and (CH 232 or CH 232H) and (CH 262 or CH 262H or CH 272) and (CH 233 or CH 233H) and (CH 263 or CH 263H or CH 273)) and (MTH 251* or MTH 251H*) and (PH 201* or PH 211*) and CH 334*) and Restricted to chemistry and biochemistry/biophysics majors. Honors College approval required.

CH 362. EXPERIMENTAL CHEMISTRY I (3). First-level integrated laboratory course for majors in chemistry and related disciplines, covering experimental techniques of analytical, inorganic, organic and physical chemistry. Lec/lab. **PREREQS:** ((CH 361 or CH 361H) and CH 335*)

CH 362H. EXPERIMENTAL CHEMISTRY I (3). First-level integrated laboratory course for majors in chemistry and related disciplines, covering experimental techniques of analytical, inorganic, organic and physical chemistry. Lec/lab. **PREREQS:** ((CH 361 or CH 361H) and CH 335*) and Honors College approval required.

CH 374. *TECHNOLOGY, ENERGY, AND RISK (3). Decision-making in a technical, democratic society. Discussion of current issues such as acid rain, toxic organic chemicals in the environment, energy resources, etc. Does not meet the prereq for any other chemistry course. Does not meet requirements for chemistry minor. (Bacc Core Course) **PREREQS:** Completion of baccalaureate core in physical science.

CH 390. ENVIRONMENTAL CHEMISTRY (3). Sources, reactions, transport, effects, and fates of chemical species in water, soil, air, and living environments and the effects of technology thereon. **PREREQS:** CH 331

CH 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

CH 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

CH 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

CH 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

CH 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

CH 407H. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required. Honors College approval required.

CH 410. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

CH 411. INORGANIC CHEMISTRY (3-4). Fundamental principles of inorganic chemistry including atomic structure, bonding models for molecules and solids, symmetry, acid/base chemistry, oxidation-reduction, and metal-ligand complexes. **PREREQS:** One year of general chemistry. College-level physics is recommended.

CH 412. INORGANIC CHEMISTRY (3-4). Descriptive chemistry of the elements, focusing on main-group compounds, transition metal complexes, and solid-state chemistry. **PREREQS:** (CH 411 or CH 511) and /or instructor approval.

CH 413. SOLID STATE CHEMISTRY (3-4). Basic principles of chemistry are applied to descriptions of structure-property relationships in inorganic solids. Topics include crystal structure, materials synthesis, chemical bonding, electronic properties, optical properties, and magnetism. Students who register for 4 credits will perform independent study of an advanced topic based on research literature. This course is repeatable for a maximum of 4 credits. **PREREQS:** (CH 442 or CH 542)

CH 416. RADIOCHEMISTRY (3). Selected methods in radiochemical analysis. Actinide chemistry, activation analysis, radionuclide solvent extraction, and microbial reactions with radionuclides. Designed for majors in chemistry, chemical engineering, nuclear engineering, and radiation health physics. **PREREQS:** ((CH 201 and CH 202 and CH 205) or (CH 221 and CH 222 and CH 223) or (CH 224H and CH 225H and CH 226H) or ((CH 231 or CH 231H) and (CH 261 or CH 261H or CH 271) and (CH 232 or CH 232H) and (CH 262 or CH 262H or CH 272) and (CH 233 or CH 233H) and (CH 263 or CH 263H or CH 273)) and /or equivalent or instructor approval required.

CH 418. NUCLEAR CHEMISTRY (3). Radioactive decay, nuclear properties, nuclear structure, alpha, beta, and gamma decay, nuclear reactions, fission, interaction of radiation with matter, chemical techniques, radiation safety, and nuclear instrumentation. **PREREQS:** Should enroll concurrently in (CH 440 or CH 540) or PH 314.

CH 419. RADIOACTIVE TRACER METHODS (4). Radionuclides, radioactivity, and radiotracer methods as research tools in physical and biological science. Lec/lab. **PREREQS:** Two years of college chemistry.

CH 421. ANALYTICAL CHEMISTRY (3). A professional sequence for majors in chemistry and related disciplines. Chemical equilibrium, analytical electrochemistry, separations, spectroscopy, instrumentation, and treatment of data. **PREREQS:** One year of general chemistry and one year of college physics. Should enroll concurrently in CH 440 or CH 540.

CH 422. ANALYTICAL CHEMISTRY (3). A professional sequence for majors in chemistry and related disciplines. Chemical equilibrium, analytical electrochemistry, separations, spectroscopy, basic electronics and instrumentation, and treatment of data. **PREREQS:** One year of general chemistry and one year of college physics. Should enroll concurrently in CH 441 or CH 541.

CH 424. BIOANALYTICAL CHEMISTRY (3). Analytical methods employed in the study of biologically important molecules. Separations (chromatography, electrophoresis), spectroscopy, mass spectrometry, biosensors, and immunoassays. Lec/lab. Not offered every year. **PREREQS:** One year of organic chemistry and one term of organic chemistry laboratory.

CH 435. STRUCTURE DETERMINATION BY SPECTROSCOPIC METHODS (3). Use of ultraviolet, infrared, nuclear magnetic resonance, and mass spectra for determination of structures and stereochemistry of complex organic molecules. **PREREQS:** (CH 336 and (CH 442 or CH 542))

CH 440. PHYSICAL CHEMISTRY (3). Thermodynamics, electrochemistry, solutions, kinetic theory of gases, chemical kinetics, quantum theory and statistical mechanics, molecular structure and spectroscopy. **PREREQS:** (MTH 254 or MTH 254H) and one year of general chemistry and one year of college physics. CH 440, CH 441, CH 442 must be taken in order.

CH 441. PHYSICAL CHEMISTRY (3). Thermodynamics, electrochemistry, solutions, kinetic theory of gases, chemical kinetics, quantum theory and statistical mechanics, molecular structure and spectroscopy. **PREREQS:** (MTH 254 or MTH 254H) and one year of general chemistry and one year of college physics. CH 440, CH 441, CH 442 must be taken in order.

CH 442. PHYSICAL CHEMISTRY (3). Thermodynamics, electrochemistry, solutions, kinetic theory of gases, chemical kinetics, quantum theory and statistical mechanics, molecular structure and spectroscopy. **PREREQS:** (MTH 254 or MTH 254H) and CH 441 and one year of general chemistry and one year of college physics. CH 440, CH 441, CH 442 must be taken in order.

CH 445. PHYSICAL CHEMISTRY OF MATERIALS (3). Structure of solid materials. Relationship between structure and mechanical, thermal, and electrical properties of materials used in high technology. Offered alternate years. **PREREQS:** (CH 442 or CH 542)

CH 450. INTRODUCTORY QUANTUM CHEMISTRY (3). Elementary wave mechanics and matrix mechanics of atoms and molecules. Quantum basis of chemical structure. Not offered every year. **PREREQS:** (CH 442 or CH 542) and one year college physics.

CH 453. CHEMICAL THERMODYNAMICS (3). The laws of chemical thermodynamics applied to analyze properties of gases, gas mixtures, liquid solutions, fluctuations, critical phenomena, and magnetic systems. Not offered every year. **PREREQS:** (CH 442 or CH 542)

CH 461. EXPERIMENTAL CHEMISTRY II (3). Second-level integrated laboratory course for majors in chemistry and related disciplines, covering experimental techniques of analytical, inorganic, organic and physical chemistry. Lec/lab. **PREREQS:** ((CH 362 or CH 362H) and CH 421* and CH 440*)

CH 461H. EXPERIMENTAL CHEMISTRY II (3). Second-level integrated laboratory course for majors in chemistry and related disciplines, covering experimental techniques of analytical, inorganic and physical chemistry. Lec/Lab. **PREREQS:** ((CH 362 or CH 362H) and CH 421* and CH 440*) and Honors College approval required.

CH 462. ^EXPERIMENTAL CHEMISTRY II (3). Second-level integrated laboratory course for majors in chemistry and related disciplines, covering experimental techniques of analytical, inorganic, organic and physical chemistry. Lec/lab. (Writing Intensive Course) **PREREQS:** ((CH 362 or CH 362H) and CH 441* and (CH 324 or CH 461H) and CH 422 is recommended.

CH 462H. ^EXPERIMENTAL CHEMISTRY II (3). Second-level integrated laboratory course for majors in chemistry and related disciplines, covering experimental techniques of analytical, inorganic, organic and physical chemistry. Lec/lab. (Writing Intensive Course) **PREREQS:** ((CH 362 or CH 362H) and CH 441* and (CH 324 or CH 461 or CH 461H)) and CH 422 is recommended. Honors College approval required.

CH 463. ^EXPERIMENTAL CHEMISTRY II (3). Second-level integrated laboratory course for majors in chemistry and related disciplines, covering experimental techniques of analytical, inorganic, organic and physical chemistry. Lec/lab. (Writing Intensive Course) **PREREQS:** ((CH 362 or CH 362H) and (CH 324 or CH 461 or CH 461H) and CH 442*)

CH 463H. ^EXPERIMENTAL CHEMISTRY II (3). Second-level integrated laboratory course for majors in chemistry and related disciplines, covering experimental techniques of analytical, inorganic, organic and physical chemistry. Lec/lab. (Writing Intensive Course) **PREREQS:** ((CH 362 or CH 362H) and (CH 324 or CH 461 or CH 461H) and CH 442*) and Honors College approval required.

CH 464. ^EXPERIMENTAL CHEMISTRY II (3). Second-level integrated laboratory course for majors in chemistry and related disciplines, covering experimental techniques of analytical, inorganic, organic and physical chemistry. Lec/lab. (Writing Intensive Course) **PREREQS:** ((CH 362 or CH 362H) and CH 442*) and CH 461 or CH 324 is recommended.

CH 464H. ^EXPERIMENTAL CHEMISTRY II (3). Second-level integrated laboratory course for majors in chemistry and related disciplines, covering experimental techniques of analytical, inorganic, organic and physical chemistry. Lec/lab. (Writing Intensive Course) **PREREQS:** ((CH 362 or CH 362H) and CH 442*) and CH 461 or CH 324 is recommended. Honors College approval required.

CH 471. ADVANCED ORGANIC CHEMISTRY (3). Principles of synthetic organic chemistry. Particular emphasis will be directed at understanding stereochemical outcomes in carbon-carbon bond-forming reactions (Diels-Alder, aldol, and pericyclic reactions). Other topics will include oxidation/reduction reactions, organometallic chemistry, and enantioselective methodologies. **PREREQS:** (CH 336 or CH 337)

CH 490. COMPUTER PROGRAMMING FOR SCIENTISTS (3). Programming, numerical and graphical analysis, problem solving, simulations and use of databases for information handling and retrieval. Applications to problems in chemistry. **PREREQS:** MTH 252

CH 501. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

CH 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

CH 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

CH 506. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

CH 507. SEMINAR (1-16). Student should enroll in the seminar section that meets the specific divisional requirements for credits and grading scheme or that is designated for teaching or mentoring programs. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

CH 510. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits.

CH 511. INORGANIC CHEMISTRY (3-4). Fundamental principles of inorganic chemistry including atomic structure, bonding models for molecules and solids, symmetry, acid/base chemistry, oxidation-reduction, and metal-ligand complexes. **PREREQS:** One year of college-level chemistry. College-level physics is recommended.

CH 512. INORGANIC CHEMISTRY (3-4). Descriptive chemistry of the elements, focusing on main-group compounds, transition metal complexes, and solid-state chemistry. **PREREQS:** CH 511 and/or instructor approval.

CH 513. SOLID STATE CHEMISTRY (3-4). Basic principles of chemistry are applied to descriptions of structure-property relationships in inorganic solids. Topics include crystal structure, materials synthesis, chemical bonding, electronic properties, optical properties, and magnetism. Students who register for 4 credits will perform independent study of an advanced topic based on research literature. This course is repeatable for a maximum of 4 credits. **PREREQS:** CH 442 or CH 542

CH 516. RADIOCHEMISTRY (4). Selected methods in radiochemical analysis. Actinide chemistry, activation analysis, radionuclide solvent extraction, and microbial reactions with radionuclides. Designed for majors in chemistry, chemical engineering, nuclear engineering, and radiation health physics. Lec/lab. **CROSSLISTED** as NE 516 and RHP 516. This course is repeatable for a maximum of 12 credits. **PREREQS:** ((NE 531 or RHP 531) and RHP 536) and/or instructor approval required.

CH 518. NUCLEAR CHEMISTRY (3). Radioactive decay, nuclear properties, nuclear structure, alpha, beta, and gamma decay, nuclear reactions, fission, interaction of radiation with matter, chemical techniques, radiation safety, and nuclear instrumentation. **PREREQS:** Should concurrently enroll in (CH 440 or CH 540) or PH 314.

CH 519. RADIOACTIVE TRACER METHODS (4). Radionuclides, radioactivity, and radiotracer methods as research tools in physical and biological science. Lec/lab. **PREREQS:** Two years of college chemistry.

CH 521. ANALYTICAL CHEMISTRY (3). A professional sequence for majors in chemistry and related disciplines. Chemical equilibrium, analytical electrochemistry, separations, spectroscopy, instrumentation, and treatment of data. **PREREQS:** One year of college chemistry, one year of college physics. Should concurrently enroll in CH 540.

CH 522. ANALYTICAL CHEMISTRY (3). A professional sequence for majors in chemistry and related disciplines. Chemical equilibrium, analytical electrochemistry, separations, spectroscopy, basic electronics and instrumentation, and treatment of data. **PREREQS:** One year of college chemistry, one year of college physics. Should concurrently enroll in CH 541.

CH 524. BIOANALYTICAL CHEMISTRY (3). Analytical methods employed in the study of biologically important molecules. Separations (chromatography, electrophoresis), spectroscopy, mass spectrometry, biosensors, and immunoassays. Lec/lab. Not offered every year. **CROSSLISTED** as VMB 524. **PREREQS:** One year of organic chemistry and one term of organic chemistry laboratory.

CH 535. STRUCTURE DETERMINATION BY SPECTROSCOPIC METHODS (3). Use of ultraviolet, infrared, nuclear magnetic resonance, and mass spectra for determination of structures and stereochemistry of complex organic molecules. **PREREQS:** CH 336 and (CH 442 or CH 542)

CH 540. PHYSICAL CHEMISTRY (3). Thermodynamics, electrochemistry, solutions, kinetic theory of gases, chemical kinetics, quantum theory and statistical mechanics, molecular structure and spectroscopy. **PREREQS:** MTH 254 and one year of college chemistry and one year of college physics. CH 540, CH 541, CH 542 must be taken in order.

CH 541. PHYSICAL CHEMISTRY (3). Thermodynamics, electrochemistry, solutions, kinetic theory of gases, chemical kinetics, quantum theory and statistical mechanics, molecular structure and spectroscopy. **PREREQS:** CH 540

CH 542. PHYSICAL CHEMISTRY (3). Thermodynamics, electrochemistry, solutions, kinetic theory of gases, chemical kinetics, quantum theory and statistical mechanics, molecular structure and spectroscopy. **PREREQS:** CH 541

CH 545. PHYSICAL CHEMISTRY OF MATERIALS (3). Structure of solid materials. Relationship between structure and mechanical, thermal, and electrical properties of materials used in high technology. Offered alternate years. **PREREQS:** CH 442 or CH 542

CH 550. INTRODUCTORY QUANTUM CHEMISTRY (3). Elementary wave mechanics and matrix mechanics of atoms and molecules. Quantum basis of chemical structure. Not offered every year. **PREREQS:** CH 542 and one year college physics.

CH 553. CHEMICAL THERMODYNAMICS (3). The laws of chemical thermodynamics applied to analyze properties of gases, gas mixtures, liquid solutions, fluctuations, critical phenomena, and magnetic systems. Not offered every year. **PREREQS:** CH 542

CH 571. ADVANCED ORGANIC CHEMISTRY (3). Principles of synthetic organic chemistry. Particular emphasis will be directed at understanding stereochemical outcomes in carbon-carbon bond-forming reactions (Diels-Alder, aldol, and pericyclic reactions). Other topics will include oxidation/reduction reactions, organometallic chemistry, and enantioselective methodologies. **PREREQS:** CH 336 or CH 337

CH 580X. ELECTRON MICROSCOPY-I (3). Basic Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM) will be introduced. Includes a brief introduction to TEM and SEM, followed by sample preparation, diffraction, contrast explanation of images obtained from TEM and SEM. Method for chemical composition analysis will also be introduced. **PREREQS:** General physics and general chemistry

CH 582. CHEMISTRY AND MATERIALS OF BATTERIES AND SUPER CAPACITORS (3). Examines the chemistry and materials currently in use and proposed for future primary and secondary batteries and supercapacitors. After a brief historical review, we will examine in detail the state-of-the-art technologies including lithium-ion, lithium, and sodium-sulfur batteries and electrochemical double-layer capacitors, and future technologies such as metal-air and lithium-sulfur. Class discussions will focus on structure/performance relationships and other issues such as environmental impact, safety and costs. Offered via Ecampus only. **PREREQS:** Full year of general chemistry. College-level physics is recommended. Additional chemistry or materials science background is recommended.

CH 584. INSTRUMENTS AND ONLINE INTERACTIONS IN THE SCIENCES (3). Examine methods and technologies for and incorporating virtual instruments and online interactions into laboratory courses to support learners in becoming critical thinkers and creative producers of their knowledge and understanding in science. **PREREQS:** Basic computer literacy and one year of general chemistry, physics or biology

CH 590. COMPUTER PROGRAMMING FOR SCIENTISTS (3). Programming, numerical and graphical analysis, problem solving, simulations and use of databases for information handling and retrieval. Applications to problems in chemistry. **PREREQS:** MTH 252

CH 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

CH 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

CH 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

CH 607. SEMINAR (1-16). Student should enroll in the seminar section that meets the specific divisional requirements for credits and grading scheme or that is designated for teaching or mentoring programs. This course is repeatable for a maximum of 16 credits.

CH 614. SELECTED TOPICS IN INORGANIC CHEMISTRY (4). Nonsequence courses designed to acquaint the advanced graduate student with recent advances in fields such as solid state chemistry, theoretical inorganic chemistry, spectroscopy and magnetism,

chemistry of coordination compounds, kinetics and mechanisms of inorganic reactions, acid-base theory and reactions in nonaqueous solvents, organometallic chemistry, and chemistry of the less familiar elements. Not offered every year. **PREREQS:** CH 413 or CH 513

CH 615. SELECTED TOPICS IN INORGANIC CHEMISTRY (3). Nonsequence courses designed to acquaint the advanced graduate student with recent advances in fields such as solid state chemistry, theoretical inorganic chemistry, spectroscopy and magnetism, chemistry of coordination compounds, kinetics and mechanisms of inorganic reactions, acid-base theory and reactions in nonaqueous solvents, organometallic chemistry, and chemistry of the less familiar elements. **PREREQ:** CH 413/CH 513. Not offered every year. This course is repeatable for a maximum of 12 credits.

CH 616. SELECTED TOPICS IN INORGANIC CHEMISTRY (4). Nonsequence courses designed to acquaint the advanced graduate student with the principles of X-ray diffraction as applied to the structural characterization of both single crystals and powders. Not offered every year. **PREREQS:** CH 413 or CH 513

CH 630. ADVANCED ORGANIC CHEMISTRY (3). Molecular orbital bonding theory, orbital symmetry, reaction mechanisms, stereoisomerism, conformational analysis, and advanced methods of synthesis. Not offered every year. **PREREQS:** CH 336 and (CH 442 or CH 542)

CH 631. ADVANCED ORGANIC CHEMISTRY (4). Carbon-carbon bond forming reactions, reaction mechanisms, stereoisomerism, conformational analysis, and advanced methods of synthesis. Not offered every year. **PREREQS:** CH 630

CH 632. ADVANCED ORGANIC CHEMISTRY (3). Molecular orbital bonding theory, orbital symmetry, reaction mechanisms, stereoisomerism, conformational analysis, and advanced methods of synthesis. Not offered every year. **PREREQS:** CH 336 and (CH 442 or CH 542)

CH 633. HYPOTHESIS, EVIDENCE, AND ARGUMENT IN ORGANIC CHEMISTRY (2). Immerses the student in the tools of scientific method as applied to current research topics in the chemical literature. The student will perform an extensive review of a modern topic in organic chemistry, prepare a written summary and analysis of this literature review and make a public oral presentation and discussion. This course is repeatable for a maximum of 4 credits. **PREREQS:** CH 632 and /or instructor permission.

CH 636. SELECTED TOPICS IN ORGANIC CHEMISTRY (3). Nonsequence courses designed to acquaint students with recent advances in organic chemistry and their application to special fields of study. Topics covered vary from term to term and year to year. Topics include: theoretical organic chemistry, recent advances in reaction mechanisms, advanced synthesis, free radical reactions, organic sulfur chemistry, and biosynthesis of natural products. CH 636, CH 637, CH 638 need not be taken in order. Not offered every year. This course is repeatable for a maximum of 12 credits.

CH 637. SELECTED TOPICS IN ORGANIC CHEMISTRY (3). Nonsequence courses designed to acquaint students with advances in organic chemistry, specifically focusing on biosynthesis of natural products and enzyme reaction mechanisms. CH 636, CH 637, CH 638 need not be taken in order. This course is repeatable for a maximum of 12 credits.

CH 638. SELECTED TOPICS IN ORGANIC CHEMISTRY (3). Nonsequence courses designed to acquaint students with recent advances in organic chemistry and their application to special fields of study. Topics covered vary from term to term and year to year. Topics include: theoretical organic chemistry, recent advances in reaction mechanisms, advanced synthesis,

free radical reactions, organic sulfur chemistry, and biosynthesis of natural products. CH 636, CH 637, CH 638 need not be taken in order. Not offered every year. This course is repeatable for a maximum of 12 credits.

CH 651. QUANTUM MECHANICS OF ATOMS AND MOLECULES (3). Not offered every year. **PREREQS:** CH 450 or CH 550

CH 652. QUANTUM MECHANICS OF MOLECULAR SPECTROSCOPY (3). Not offered every year. **PREREQS:** CH 651

CH 660. SPECTROCHEMICAL ANALYSIS (3). Theoretical concepts and methodology of optical spectrochemical methods of analysis, components of spectrometers, flame and electrothermal atomic spectrophotometry, ICP atomic emission spectrometry, molecular absorption and fluorescence spectrometry. **PREREQS:** CH 442 or CH 542

CH 661. SEPARATIONS: CHROMATOGRAPHY AND RELATED METHODS (4). Theory, instrumentation, and practice of modern separation techniques (gas chromatography, liquid chromatography, electrokinetic separations) and sample preparation methods; handling and interpretation of chromatographic and electrophoretic data. **PREREQS:** CH 440 or CH 540 (Thermodynamics) recommended or instructor's permission.

CH 662. ANALYTICAL ELECTROCHEMISTRY (4). Study of current, voltage and time relationships in electrochemical cells. Offered alternate years. **PREREQS:** CH 442 recommended or instructor permission.

CH 680. SELECTED TOPICS IN PHYSICAL CHEMISTRY (2). Nonsequence courses designed to acquaint students with recent advances in physical chemistry. Topics include molecular structure dynamics determination (UV-visible, near-IR light sources, x-ray, electron and neutron diffraction), spectroscopy (ultrafast, nonlinear, multidimensional, multiphoton, magnetic resonance, photoelectron), physical chemistry of condensed phase systems (biomolecules, aqueous solution, novel materials, ionic, molecular and liquid crystals, critical phenomena, mass transport), theoretical chemistry (chemical bonding, scattering theory, group theory, dynamics), electronic structure theory of molecules, structural dynamics of complex systems. Need not be taken in order. Not offered every year. This course is repeatable for a maximum of 12 credits. **PREREQS:** CH 550 and graduate standing.

CH 681. SELECTED TOPICS IN PHYSICAL CHEMISTRY (2). Nonsequence courses designed to acquaint students with recent advances in physical chemistry. Topics include molecular structure determination (x-ray, electron and neutron diffraction), spectroscopy (nonlinear and multiphoton, magnetic resonance, photoelectron, Moessbauer effect), physical chemistry of condensed phases (ionic, molecular and liquid crystals, critical phenomena, mass transport), theoretical chemistry (chemical bonding, scattering theory, group theory, dynamics), electronic structure theory of molecules. Need not be taken in order. Not offered every year. This course is repeatable for a maximum of 12 credits. **PREREQS:** Graduate standing.

CH 682. SELECTED TOPICS IN PHYSICAL CHEMISTRY (2). Nonsequence courses designed to acquaint students with recent advances in physical chemistry. Topics include molecular structure determination (x-ray, electron and neutron diffraction), spectroscopy (nonlinear and multiphoton, magnetic resonance, photoelectron, Moessbauer effect), physical chemistry of condensed phases (ionic, molecular and liquid crystals, critical phenomena, mass transport), theoretical chemistry (chemical bonding, scattering theory, group theory, dynamics), electronic structure theory of molecules. Need not be taken in order. Not offered every year. This

course is repeatable for a maximum of 12 credits. **PREREQS:** Graduate standing.

CH 683. SELECTED TOPICS IN ANALYTICAL CHEMISTRY (2). Nonsequence courses designed to acquaint the advanced graduate student with recent advances in analytical chemistry. Not offered every year. This course is repeatable for a maximum of 12 credits. **PREREQS:** Graduate standing or instructor approval required.

CH 684. SELECTED TOPICS IN ANALYTICAL CHEMISTRY (2). Nonsequence courses designed to acquaint the advanced graduate student with recent advances in analytical chemistry. Not offered every year. This course is repeatable for a maximum of 12 credits. **PREREQS:** Graduate standing or instructor approval required.

CH 685. SELECTED TOPICS IN ANALYTICAL CHEMISTRY (2). Nonsequence courses designed to acquaint the advanced graduate student with recent advances in analytical chemistry. Not offered every year. This course is repeatable for a maximum of 12 credits. **PREREQS:** Graduate standing or instructor approval required.

CH 686. SELECTED TOPICS IN NUCLEAR AND RADIATION CHEMISTRY (2). Nonsequence courses designed to acquaint the advanced graduate student with recent advances in nuclear and radiation chemistry. Not offered every year. This course is repeatable for a maximum of 12 credits. **PREREQS:** Graduate standing or instructor approval required.

CH 687. SELECTED TOPICS IN NUCLEAR AND RADIATION CHEMISTRY (2). Nonsequence courses designed to acquaint the advanced graduate student with recent advances in nuclear and radiation chemistry. Not offered every year. This course is repeatable for a maximum of 12 credits. **PREREQS:** Graduate standing or instructor approval required.

CH 688. SELECTED TOPICS IN NUCLEAR AND RADIATION CHEMISTRY (2). Nonsequence courses designed to acquaint the advanced graduate student with recent advances in nuclear and radiation chemistry. Not offered every year. This course is repeatable for a maximum of 12 credits. **PREREQS:** Graduate standing or instructor approval required.

CH 692. ENVIRONMENTAL TRANSFORMATION OF ORGANIC COMPOUNDS (3). Chemical, photochemical, and biological transformation reactions of organic compounds in the environment. Test methods and predictive models for determining the persistence of organic compounds in the environment. Offered alternate years. **PREREQS:** CH 336 and CH 440 or instructor approval required.

CH 696. COMPUTER INTERFACING (4). Introduction to the use of microcomputers for data acquisition and data manipulation in the laboratory. The emphasis will be on the use of software and hardware for the IBM-compatible personal computer. Programming in Visual Basic and Windows languages will be covered, as well as use of commercial software and hardware. Familiarity with analog signal conditioning and simple digital circuitry will be assumed.

CH 697. MASS SPECTROMETRY OF ORGANIC COMPOUNDS (4). Physical principles of mass spectrometric instrumentation and interpretation of the mass spectra of organic compounds and biomolecules. Not offered every year.

GENERAL SCIENCE

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Undergraduate Major
General Science (BS, CRED, HBS)

Option
Pre-Education

**Pre-professional Options
in Health Sciences**
Pre-Clinical Laboratory Science
Pre-Dentistry
Pre-Medicine
Pre-Optometry
Pre-Pharmacy
Pre-Physical Therapy
Pre-Physician Assistant
Pre-Podiatry
Pre-Veterinary Medicine

Nondegree, Transfer Options
Pre-Nursing Education
Pre-Occupational Therapy

The BS degree in General Science is only granted along with an option. Because of the interdisciplinary nature of the General Science major, students may not obtain a dual major or double degree in General Science concurrently with or subsequent to a degree in biochemistry/biophysics, biology, microbiology, or zoology.

The Pre-Education option provides a degree appropriate for entry into a master's degree program in elementary/middle school education or OSU's double degree in Education. Admission into teacher licensure programs is competitive. See the College of Education for more information.

**PRE-PROFESSIONAL PROGRAMS
IN THE HEALTH SCIENCES**

The College of Science offers specialized programs for students who wish to pursue careers in health-related fields. They provide excellent academic preparation for students who plan to enter medical, pharmacy, veterinary, or dental school, and for those choosing careers in nursing, clinical laboratory science, occupational therapy, optometry, physical therapy, physician assistant, and podiatry. The curricula listed below generally fulfill requirements at the respective professional schools. However, requirements vary from school to school, so it is the student's responsibility to check specific requirements for any school to which the student plans to apply.

Pre-medical students are encouraged to choose a major in an academic department. Majors in biochemistry/biophysics, biology, chemistry, and microbiology include all the courses required by most medical schools. The program for nursing leads to a bachelor's degree obtained at the professional school (for example, the Oregon Health and Science University).

**GENERAL SCIENCE
(BS, CRED, HBS)**

To earn a bachelor's degree in General Science, students must choose one of the options listed below:

- Pre-Clinical Laboratory Science
- Pre-Dentistry
- Pre-Education
- Pre-Medicine
- Pre-Optometry
- Pre-Pharmacy
- Pre-Physical Therapy
- Pre-Physician Assistant
- Pre-Podiatry
- Pre-Veterinary Medicine

The following General Science options are designed to meet prerequisites for nursing and occupational therapy programs at other institutions, but do not lead to an OSU degree:

- Pre-Nursing Education
- Pre-Occupational Therapy

**The General Science major with
the Pre-Education option also is
available on the OSU-Cascades
campus.**

The following is a General Science course plan. Specific degree requirements may be found under the option requirements.

First Year

CH 121, CH 122, CH 123. General Chemistry (5,5,5)

or CH 231, CH 232, CH 233. *General Chemistry (4,4,4) and CH 261, CH 262, CH 263. *Laboratory for Chemistry 231, 232, 233 (1,1,1)

Approved mathematical science (12)

(See the mathematics requirements listed for each option. Some may require more than 12 credits of mathematics, computer science and statistics courses.)

Fitness (3)

Baccalaureate core courses and/or electives (9)

Speech (3)

WR 121. *English Composition (3)

Sophomore Year

General biology (12)

General physics or physical science (12–15)

Baccalaureate core courses and/or electives (15–18)

Writing II (3)

Junior and Senior Years

History of Science (HSTS) course (4), to include one WIC course from below:

Select one WIC course from below (4):

HSTS 415. ^*Theory of Evolution and Foundation of Modern Biology (4)

HSTS 417. ^*History of Medicine (4)

HSTS 419. ^*Studies in Scientific Controversy: Methods and Practices (4)

HSTS 422. ^*Historical Studies of Science and Politics (4)

HSTS 425. ^*History of the Life Sciences (4) Option and baccalaureate core courses and electives (75)¹

Synthesis (6)

Speech (3)

Footnotes:

¹ Students must take a minimum of 24 credits of upper-division science from departments in the College of Science.

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

OPTIONS

**PRE-CLINICAL LABORATORY
SCIENCE OPTION**

Claire Colvin, Chief Advisor

Clinical laboratory scientists (also known as medical laboratory scientists or medical technologists) perform routine and highly specialized diagnostic procedures in clinical laboratories. They must be certified by the American Society of Clinical Pathologists (ASCP) or the National Certification Agency (NCA). Certification requires 12 to 15 months of training at an accredited professional school of clinical laboratory science. Oregon currently has one such school jointly administered by the Oregon Health and Science University (OHSU) and Oregon Institute of Technology (OIT); Washington and California have several; and other schools are located throughout the U.S. Most clinical laboratory science schools require a bachelor of science degree for admission to their educational program; however, some schools (notably OHSU/OIT) accept students who have had three years of appropriate college work.

The curriculum in the OSU Pre-Clinical Laboratory science program was developed in cooperation with nearby clinical laboratory science schools, and OSU students have shown a high success rate in these schools. Most pre-clinical laboratory science students complete the BS degree in a field closely related to clinical laboratory science, such as microbiology, biochemistry, biology, zoology, or general science and then attend clinical laboratory science school (4+1 program).

First Year (45)

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

CH 121, CH 122, CH 123. General Chemistry (5,5,5)

or CH 231, CH 232, CH 233. *General Chemistry (4,4,4)

and CH 261, CH 262, CH 263.

*Laboratory for Chemistry 231, 232, 233 (1,1,1)

HHS 231. *Lifetime Fitness for Health (2)

HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)

or any PAC course (1–2)

MB 110. Orientation to Microbiology (1)
 MTH 111. *College Algebra (4)
 MTH 112. *Elementary Functions (4)
 WR 121. *English Composition (3)
 Speech (3)

Sophomore Year (45)

BI 314. Cell and Molecular Biology (4)
 CH 331, CH 332, CH 337. Organic
 Chemistry and Lab (4,4,4)
 MB 302, MB 303. General Microbiology and
 Lab (3,2)
 PHAR 210. Terminology of the Health
 Sciences (2)

Take 4 credits of Statistics:

ST 201. Principles of Statistics (4)
 or ST 351. Introduction to Statistical
 Methods (4)
 Writing II (3)
 Baccalaureate core courses (12)
 Electives (3)

Junior Year (45)

BB 450, BB 451. General Biochemistry (4,3)
 MB 310. Bacterial Molecular Genetics (3)
 MB 311. ^Molecular Microbiology Lab (3)
 MB 416. Immunology (3)
 PH 201, PH 202, PH 203. *General Physics
 (5,5,5)
 Contemporary Global Issues (3)
 Science, Technology, and Society (3)
 Electives (8)

Senior Year (45)

Completion of a one-year clinical
 laboratory science program
 or Z 331, Z 332, Z 333. Human Anatomy
 and Physiology (3,3,3)
 and Z 341, Z 342, Z 343. Human Anatomy
 and Physiology Lab (2,2,2)
 Plus additional electives to total 60 upper-
 division credits.
 Electives (30)

Total=180

PRE-DENTISTRY OPTION

Chere Pereira, Chief Advisor

The College of Science offers a pre-dental curriculum leading to a Bachelor of Science degree in General Science that satisfies the requirements for admission to most dental schools.

Students may wish to declare another major, such as biology, microbiology, or zoology, to gain a broader background should plans to enter dental school change. In this case, students should consult with a departmental advisor as soon as feasible and select electives that will satisfy the requirements in the chosen major.

Admission to dental school is competitive; students are selected on the basis of grades, DAT scores, dental experience, and apparent motivation for dentistry. A member of the pre-dental committee is assigned to each student as an advisor.

First Year (45)

BI 107. Health Professions: Dental (1)
 CH 231, CH 232, CH 233. *General
 Chemistry (4,4,4)
and CH 261, CH 262, CH 263.

*Laboratory for Chemistry 231, 232, 233
 (1,1,1)

MTH 251. *Differential Calculus (4)
 MTH 252. Integral Calculus (4)
 or MTH 268. Mathematical Ideas in
 Biology (4)
 or ST 201. Principles of Statistics (4)
 or ST 351. Introduction to Statistical
 Methods (4)
 Speech (3)
 WR 121. *English Composition (3)
 Baccalaureate core courses and electives (15)

Sophomore Year (45–46)

BI 211, BI 212, BI 213. *Principles of
 Biology (4,4,4)
 CH 331, CH 332, CH 337. Organic
 Chemistry (4,4,4)
 Baccalaureate core courses and electives (14)
 Additional math, computer science, or
 statistics courses (4)
 Writing II (3)

Junior Year (42–48)

BI 314. Cell and Molecular Biology (4)
 BB 450, BB 451. General Biochemistry (4,3)
 or BB 350. Elementary Biochemistry (4)
 BI 311. Genetics (4)

Choose 4 credits of WIC from the following:

HSTS 415. ^Theory of Evolution and
 Foundation of Modern Biology (4)
 HSTS 417. ^History of Medicine (4)
 HSTS 425. ^History of the Life Sciences (4)
 Z 331, Z 332, Z 333. Human Anatomy and
 Physiology (3,3,3)
 Z 341, Z 342, Z 343. Human Anatomy and
 Physiology Labs (2,2,2)
 Electives (12–15)

Senior Year (45)

BI 460. Cell Biology (3)
 PH 201, PH 202, PH 203. *General Physics
 (5,5,5)
 Z 425. Embryology and Development (5)
 Baccalaureate core courses and electives (22)
 Graduation in general science/pre-dentistry
 requires a total of 40 credits of upper-
 division courses in science.

PRE-EDUCATION OPTION

Jen Olarra, Chief Advisor

The BS degree in General Science with a Pre-Education option is now offered at the OSU-Cascades branch campus in Bend. Please contact an OSU-Cascades advisor regarding course articulation from Central Oregon Community College.

The General Science major with the Pre-Education option is designed to prepare students interested in teaching elementary or middle school science to enter teacher licensure programs. The College of Education offers a master's degree with teacher certification while the College of Education offers a concurrent bachelor's degree with teacher certification.

Other pre-education options are offered in the College of Science through the Biology Program and departments of Chemistry, Mathematics, and Physics.

Students wishing to teach at the secondary school level are encouraged to major in their subject area with a pre-education option. It is important to work with an advisor to ensure that all requirements to enter a teacher licensure program are met. Experience in a classroom is required for entry into most teacher education programs.

First Year (45)

CH 121. General Chemistry (5)
 CH 122, CH 123. *General Chemistry (5,5)
 or CH 231, CH 232, CH 233. *General
 Chemistry (4,4,4) **and** CH 261, CH 262,
 CH 263. *Laboratory for Chemistry 231,
 232, 233 (1,1,1)
 GEO 105. *Geography of the Non-Western
 World (3)
 or GEO 325. *Geography of Africa (3)
 or GEO 327. *Geography of Asia (3)
 or GEO 328. *Geography of Latin America
 (3)
 HHS 231. *Lifetime Fitness for Health (2)
 HHS 241–HHS 248. *Lifetime Fitness:
 (various activities) (1)
 or any PAC course (1–2)
 MTH 111. *College Algebra (4)
 MTH 211, MTH 212. *Foundations
 Elementary Mathematics (4,4)
 PSY 201, PSY 202. *General Psychology (3,3)
 Speech (3)
 WR 121. *English Composition (3)

Sophomore Year (45)

BI 101, BI 102, BI 103. *General Biology (4,4,4)
 or BI 211, BI 212, BI 213. *General Biology
 (4,4,4) (*BI 21X series recommended*)
 MTH 390. Foundations Elementary
 Mathematics (4)
 SED 407. Seminar: Introduction to Science
 Education (2) (*Required*)
 WR II. *English Composition (3)
 Literature and Arts—Choose one course
 from Baccalaureate Core Literature and
 Arts category.

Recommended:

ART 101. *Introduction to the Visual Arts (4)
 ENG 106. *Introduction to Literature:
 Poetry (3)
 TA 147. *Introduction to the Theatre (3)

Practicum Experience (Choose 6 credits minimum from the following):

SED 406. Projects (1–16)
 TCE 309. Field Practicum (3) (*Repeatable
 credit*)
 TCE 409. Practicum/Clinical Experience:
 Winter Break or September Experience
 (1–3) (*Repeatable credit*)

Note: All practica must be completed in a science or math classroom.

Earth Science. (Choose 8 credits from the following):

GEO 101. *The Solid Earth (4)
 GEO 102. *The Surface of the Earth (4)
 GEO 201. *Physical Geology (4)
 GEO 202. *Earth Systems Science (4)
 GEO 203. *Evolution of Planet Earth (4)
 Electives (7)

Junior Year (45)**History (Choose one course from each group for a total of 8 credits)**

HST 101, HST 102, or HST 103. *History of Western Civilization (4)

HST 201, HST 202, or HST 203. *History of the U.S. (4)

Physics or physical sciences, choose from below (11–15):

PH 201, PH 202, PH 203. *General Physics (5,5,5)

or PH 211, PH 212, PH 213. *General Physics with Calculus (4,4,4)

or ATS 210. Introduction to the Atmospheric Sciences (3)

or PH 104. *Descriptive Astronomy (4)

or PH 106. *Perspectives in Physics (4)

Human Development (Choose 2–4 credits from the following)

HDFS 313. Adolescent Development (4)

or TCE 253. Learning Across the Lifespan (3)

or TCE 412. Learning Styles and Needs in Adolescence (2)

Education (Choose a minimum of 12 credits in SED or TCE from the recommended list below)

SED 412. Technology Foundations for Teaching Math and Science (3)

SED 413. Inquiry in Science and Science Education (3)

or SED 414. Inquiry in Mathematics and Mathematics Education (3)

TCE 216. *Purpose, Structure, and Function of Education in a Democracy (3)

TCE 219. Multicultural Issues in Educational Settings (3)

Contemporary Global Issues (3)

Electives (3–9)

Senior Year (45)

Must consist of at least 31 credits of upper-division science courses (including 4 credits of history of science) that are pre-approved by the head advisor in the College of Science.

Choose 4 credits of WIC from the following:

HSTS 415. ^Theory of Evolution and Foundation of Modern Biology (4)

HSTS 419. ^Studies in Scientific Controversy: Methods and Practices (4)

HSTS 422. ^Historical Studies of Science and Politics (4)

HSTS 425. ^History of the Life Sciences (4)

No more than 6 credits of unstructured courses numbered 401, 403, 405, 407, and 410 may be included in the major option.

Electives (14)

A foreign language, especially Spanish, is recommended.

PRE-MEDICINE OPTION

Chere Pereira, *Chief Advisor*

Premedical Program

Students can apply to medical school with any major, including non-science areas, as long as they take the required courses listed by the school to which they apply. Since the basic entrance requirements include a year each of biology, general chemistry, organic

chemistry, and physics, this course work can easily be incorporated into many different majors. The most commonly used science majors are biology, biochemistry/biophysics, chemistry, microbiology and zoology. The General Science–Pre-Medicine option is reserved for primarily for post-baccalaureate students who already have a bachelor's degree in another subject and need science course work to apply to medical school. Medical schools have indicated a preference for a departmental major that is pursued in depth; therefore the General Science major is now rarely used. The book, *Medical School Admission Requirements* published by the Association of American Medical Colleges, lists specific entrance requirements for each MD school. The American Association of Colleges of Osteopathic Medicine lists requirements for osteopathic (DO) schools.

Admission to medical schools is very competitive. Students are chosen according to grades, MCAT scores, medical experience, and apparent motivation for medicine. A member of the premedical committee is assigned to each student as an advisor. A list of advisors is available in the College of Science office.

First Year (45)

BB 100. The Molecules of Life (2)

BI 109. Health Professions: Medical (1)

CH 231, CH 232, CH 233. *General Chemistry (4,4,4)

and CH 261, CH 262, CH 263.

*Laboratory for Chemistry 231, 232, 233 (1,1,1)

MTH 251. *Differential Calculus (4)

MTH 252. Integral Calculus (4)

WR 121. *English Composition (3)

Speech (3)

Baccalaureate core courses and electives (13)

Sophomore Year (45–47)

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

BI 314. Cell and Molecular Biology (4)

CH 331, CH 332, CH 337. Organic Chemistry (4,4,4)

Baccalaureate core courses and electives (14)

Writing II (3)

Junior Year (44–46)

BB 450, BB 451. General Biochemistry (4,3)

BI 311. Genetics (4)

CH 324. Quantitative Chemistry (4)

PH 201, PH 202, PH 203. *General Physics (5,5,5)

ST 201. Principles of Statistics (4)

or ST 351. Introduction to Statistical Methods (4)

Baccalaureate core courses and electives (8–9)

Choose 4 credits of WIC from the following:

HSTS 415. ^Theory of Evolution and Foundation of Modern Biology (4)

HSTS 417. ^History of Medicine (4)

HSTS 425. ^History of the Life Sciences (4)

Senior Year (45)

BI 460. Cell Biology (3)

Z 425. Embryology and Development (5)

Baccalaureate core courses and electives (35)

Students should plan their senior year in consultation with a premedical advisor. Graduation in general science/pre-medicine requires a total of 45 credits of upper-division courses in science.

PRE-NURSING EDUCATION OPTION**(Transfer Program)**

Christopher Wheeler, *Chief Advisor*

The College of Science offers a preparatory curriculum designed to meet the general requirements for admission to a baccalaureate degree nursing program. Two years of pre-nursing followed by two or three years of professional training at a school of nursing lead to a Bachelor of Science degree in Nursing (BSN). Satisfactory completion of the pre-nursing requirements does not guarantee admission to a BSN program, since applicants are accepted on a competitive basis.

BSN programs are available at several colleges and universities in Oregon. Application for admission to these schools is usually made in the sophomore year. Some schools of nursing also offer accelerated BSN programs for students who already hold a BA or BS degree and have completed certain prerequisite courses; application is made after the bachelor's degree is conferred.

Associate degrees in nursing (ADN) are offered by most community colleges in Oregon. Nurses with associate degrees are qualified to provide direct patient care. To become a Registered Nurse, both BSN and ADN graduates must pass a licensing examination administered by the State Board of Nursing.

Nursing Curriculum

The prerequisites and general requirements for admission vary between nursing programs. Students' course selection will vary depending on the nursing schools to which they plan to apply. It is strongly recommended that Pre-Nursing students meet with the Pre-Nursing advisor to help them create an appropriate course schedule. Below is a sample schedule illustrating many of the common nursing school prerequisites. The courses listed below are recommended to fulfill the general requirements for admission to a BSN program. **However, requirements vary from school to school, so students planning a program must check the specific requirements of the BSN programs to which they plan to transfer.**

Nursing Core, First Year

ANTH 110. *Introduction to Cultural Anthropology (3)

or ANTH 210. *Comparative Cultures (3)

CH 121, CH 122, CH 123. General Chemistry (5,5,5)

or CH 231, CH 232, CH 233. *General Chemistry (4,4,4)

and CH 261, CH 262, CH 263.

*Laboratory for Chemistry 231, 232, 233 (1,1,1)

or CH 130. General Chemistry of Living Systems (4)

MTH 095. Intermediate Algebra (3)

or MTH 111. *College Algebra (4)

PSY 201, PSY 202. *General Psychology (3,3)

SOC 204. *Introduction to Sociology (3)

WR 121. *English Composition (3)

WR 222. *English Composition (3)

English literature course (3)

History course (3)

Nursing Core, Second Year

MB 230. *Introductory Microbiology (4)

NUTR 225. Human Nutrition (3)

or NUTR 240. Human Nutrition (3)

and NUTR 241. Applications in Human Nutrition (1)

PSY 350. Human Lifespan Development (3)

ST 201. Principles of Statistics (4)

Z 331, Z 332, Z 333. Anatomy and Physiology (3,3,3)

Z 341, Z 342, Z 343. Anatomy and Physiology Lab (2,2,2)

Nursing Electives, BSN-Program Specific

Pre-Nursing students may need to take some of the classes listed below. Not all classes apply to each BSN program. It is **strongly recommended** that Pre-Nursing students meet with the Pre-Nursing advisor to determine which of these courses they need to complete.

BI 212, BI 213. *Principles of Biology (4,4)

or BI 102, BI 103. *General Biology (4,4)

COMM 111. *Public Speaking (3)

or COMM 218. *Interpersonal Communication (3)

HHS 231. *Lifetime Fitness (2)

Humanities: various courses (16–18)

PAC Courses (2)

PHL 160. *Quests for Meaning: World Religions (4)

PHL 205. *Ethics (4)

WR 327. *Technical Writing (3)

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

PRE-OCCUPATIONAL THERAPY OPTION

(Transfer Program)

Ariella Wolf, *Chief Advisor*

Occupational therapy uses meaningful activity to help people of all ages prevent, lessen, or overcome disabilities. Occupational therapists work in hospitals, schools, and mental health and community agencies.

The College of Science offers a *transfer program* designed to meet **most** requirements for admission to bachelor's degree programs around the country. For programs at the bachelor's degree level, students must meet both pre-professional requirements and general education requirements at the school to which admission is desired. Therefore, students are

urged to check the prerequisite courses at each school carefully and to work closely with admissions officers to see that these requirements are fulfilled.

Students in the pre-occupational therapy curriculum may choose to complete a Bachelor's degree at OSU and apply to master's level programs in occupational therapy. This is the preferred option for most OSU students. Students considering this option should consult with the pre-OT advisor.

Satisfactory completion of the OSU course work facilitates, but does not guarantee, admission to a school of occupational therapy, since applicants are selected on a competitive basis.

First Year (44–46 credits)

ANTH 110. *Introduction to Cultural Anthropology (3)

BI 101 and BI 102 or BI 103. *General Biology (4,4)

COMM 111. *Public Speaking (3)

EXSS 132. Introduction to Allied Health Sciences (1)

HHS 231. *Lifetime Fitness for Health (2)

HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)

or any PAC Course (1–2)

MTH 111. *College Algebra (4)

PH 106. *Perspectives in Physics (4)

or PH 201. *General Physics (5)

PSY 201, PSY 202. *General Psychology (6)

SOC 204. *Introduction to Sociology (3)

SOC 206. *Social Problems and Issues (3)

WR 121. *English Composition (3)

Applied art and/or humanities (3)

Sophomore Year (45 credits)

PHAR 210. Terminology of the Health Sciences (2)

PSY 350. Human Life Span Development (4)

PSY 360. Social Psychology (4)

ST 201. Principles of Statistics (4)

WR 222. *English Composition (3)

Z 331, Z 332, Z 333. Human Anatomy and Physiology (3,3,3)

Z 341, Z 342, Z 343. Human Anatomy and Physiology Lab (2,2,2)

Applied art and/or humanities (8)¹

Physical Activity Courses (PAC) (3)

Junior Year (45 credits)

EXSS 343. Pre-Therapy/Allied Health Seminar (1)²

PSY 301. Research Methods in Psychology (4)

PSY 330. Brain and Behavior (4)

or PSY 340. Cognition (4)

PSY 381. Abnormal Psychology (4)

ST 352. Introduction to Statistical Methods (4)

WR 323. *English Composition (3)

Applied art and/or humanities (7)¹

Cultural Diversity course (3)

Electives (13)

Non-Western Culture course (3)

Footnotes:

¹ 18 Credits of applied art (ceramics, woodworking, etc.) and humanities are required.

² Work experience with an occupational therapist is strongly recommended.

PRE-OPTOMETRY OPTION

Ariella Wolf, *Chief Advisor*

To prepare for a career as an optometrist, students need three or four years of undergraduate work in science, followed by four years at an accredited college of optometry. Completion of the professional program leads to the degree of Doctor of Optometry. The curriculum described below satisfies the entrance requirements to **most** optometry schools in the United States. Applicants to optometry schools are accepted on a competitive basis. Students are encouraged to carefully check the prerequisites at the optometry schools of their interest and to work closely with admissions officers to see that all requirements have been fulfilled. Pre-Optometry students interested in working toward biology or zoology degrees should consult with an advisor in these majors.

First Year (45)

CH 231, CH 232, CH 233. *General Chemistry (4,4,4)

and CH 261, CH 262, CH 263.

*Laboratory for Chemistry 231, 232, 233 (1,1,1)

HHS 231. *Lifetime Fitness for Health (2)

HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)

or any PAC course (1–2)

MTH 251. *Differential Calculus (4)

MTH 252. Integral Calculus (4)

PSY 201, PSY 202. *General Psychology (3,3)

WR 121. *English Composition (3)

Speech (3)

Bacc Core and Electives (7)

Sophomore Year (45)

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

CH 331, CH 332, CH 337. Organic Chemistry and Lab (4,4,4)

ST 201, ST 202. Principles of Statistics (4,4)

Writing II (3)

Baccalaureate Core courses (9)

Electives (3)

Junior Year (45)

PH 201, PH 202, PH 203. *General Physics (5,5,5)

or PH 211, PH 212, PH 213. *General Physics with Calculus (4,4,4)

WR 327. *Technical Writing (3)

(recommended)

Z 331, Z 332, Z 333. Human Anatomy and Physiology (3,3,3)

and Z 341, Z 342, Z 343. Human Anatomy and Physiology Lab (2,2,2)

Contemporary Global Issues (3)

Science Technology and Society (3)

Electives (6) (*PHL 444 recommended*)

Senior Year (45)

BB 450, BB 451. General Biochemistry (4,3)

BI 311. Genetics (4)

BI 314. Cell and Molecular Biology (4)

MB 302, MB 303. General Microbiology and Lab (3,2)

Electives (21) (*PH 332 recommended*)

Choose 4 credits of WIC from the following:

HSTS 415. ^*Theory of Evolution and Foundation of Modern Biology (4)
 HSTS 417. ^*History of Medicine (4)
 HSTS 419. ^*Studies in Scientific Controversy: Methods and Practices (4)
 HSTS 422. ^*Historical Studies of Science and Politics (4)
 HSTS 425. ^*History of the Life Sciences (4)
 Students who undertake a four-year program should plan their senior year in consultation with their advisor. Two study plans are available:

A departmental major may be completed in any department of the College of Science.

Students without a departmental major may earn a Bachelor of Science degree in General Science; a total of 41 credits of approved upper-division courses in science are required.

Recommended electives:

BB 331. *Introduction to Molecular Biology (3)
 BI 460, BI 461. Cell Biology and Lab (3,2)
 BI 370. Ecology (3)
 CH 324. Quantitative Analysis (4)
 CH 440, CH 441, CH 442. Physical Chemistry (3,3,3)
 HSTS 411, HSTS 412, HSTS 413. *History of Science (4,4,4)
 MB 416, MB 417. Immunology, Immunology Lab (3,2)
 MB 430. Bacterial Pathogenesis (3)
 MB 434. Virology (3)
 MB 435. Pathogenic Microbes Lab (2)
 MTH 254. Vector Calculus I (4)
 MTH 256. Applied Differential Equations (4)
 PH 332. *Light, Vision, and Color (3)
 PSY 330. Brain and Behavior (4)
 PSY 432. Physiological Psychology (4)
 PSY 442. Perception (4)
 Z 425. Embryology and Development (5)
 Z 431, Z 432. Vertebrate Physiology (4,4)

PRE-PHARMACY OPTION

Alex Aljets, Chief Advisor

The College of Science offers a preparatory program designed to meet most requirements for admission to pharmacy schools across the U.S., including OSU's Doctor of Pharmacy (PharmD) professional program. Students who complete the four-year pre-pharmacy program earn a BS degree in General Science with a Pre-Pharmacy option. Satisfactory completion of the pre-pharmacy course work facilitates, but does not guarantee, admission to pharmacy school; applicants are selected on a competitive basis. Students are urged to carefully check admission requirements at their schools of interest and work closely with admission representatives in order to make sure they are meeting all requirements.

First Year

CH 231, CH 232, CH 233. *General Chemistry (4,4,4)
and CH 261, CH 262, CH 263.

*Laboratory for Chemistry 231, 232, 233 (1,1,1)
 COMM 218. *Interpersonal Communication (3)
 or COMM 114. *Argument and Critical Discourse (3)
 MTH 111. *College Algebra (4)
 or MTH 112. *Elementary Functions (4)
 MTH 241. *Calculus for Management and Social Science (4)
 or MTH 251. *Differential Calculus (4)
 PHAR 201. Pharmacy Orientation (2)
Recommended
 PSY 201. *General Psychology (3)
 WR 121. *English Composition (3)
 Fitness (3)
 Speech (3)—COMM 218. *Interpersonal Communication (3) or COMM 114. *Argument and Critical Discourse (3)
 Baccalaureate Core courses and/or electives (8)

Second Year

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)
 CH 331, CH 332. Organic Chemistry, Lab (4,4)
 CH 337. Organic Chemistry, Lab (4)
 ST 201. Principles of Statistics (4)
 Additional math, statistics, or computer science to total 12 credits.
 Writing II (3)
 Baccalaureate Core courses and/or electives (15)

Third Year

BI 314. Cell and Molecular Biology (4)
 MB 302. General Microbiology (3)
 MB 303. General Microbiology Lab (2)
 PH 201, PH 202, PH 203. *General Physics (5,5,5)
 PHAR 210. Medical Terminology (2)
Recommended
 Z 430. Principles of Physiology (4)
 Z 431, Z 432. Vertebrate Physiology (4,4)
 Baccalaureate Core courses and/or electives (7)

Fourth Year

Contemporary Global Issues (recommend H 312. *Aids and STDs in Modern Society) (3)
 Science, Technology, and Society (3)

Choose one WIC course from the following:

HSTS 415. ^*Theory of Evolution and Foundation of Modern Biology (4)
 HSTS 417. ^*History of Medicine (4)
 HSTS 419. ^*Studies in Scientific Controversy: Methods and Practices (4)
 HSTS 422. ^*Historical Studies of Science and Politics (4)
 HSTS 425. ^*History of the Life Sciences (4)
 PHAR 432. ^*Writing in the Pharmaceutical Sciences (2)

Additional courses from upper-division science or first-year professional pharmacy courses to total 36 credits of upper-division science. A total of 180 credits with 60 upper-division credits (courses numbered 300 and above) are required to graduate.

Additional courses required for entry into OSU's PharmD program:

BB 450. General Biochemistry (4)

BB 451. General Biochemistry (3)
 Certification in Basic First Aid and CPR
 ECON 201. *Introduction to Microeconomics (4)
 or ECON 202. *Introduction to Macroeconomics (4)
 or AREC 250. *Introduction to Environmental Economics and Policy (3)
 Z 441, Z 442, Z 443. Advanced Human Anatomy and Physiology Lab (2,2,2)

PRE-PHYSICAL THERAPY OPTION

Ariella Wolf, Chief Advisor

The College of Science offers a preparatory program designed to meet **most** general requirements for admission to physical therapy schools. Students who complete the four-year pre-physical therapy program earn a BS degree in General Science with a Pre-Physical Therapy option. Satisfactory completion of the OSU course work facilitates, but does not guarantee, admission to a school of physical therapy; applicants are selected on a competitive basis. Students are urged to carefully check admission requirements at their schools of interest and work closely with admission representatives in order to make sure they are meeting all requirements.

First Year (45)

CH 121, CH 122, CH 123. *General Chemistry (5,5,5)
 or CH 231, CH 232, CH 233. *General Chemistry (4,4,4)
 and CH 261, CH 262, CH 263.
 *Laboratory for Chemistry 231, 232, 233 (1,1,1)
 EXSS 132. Introduction to the Allied Health Professions (1)
 HHS 231. *Lifetime Fitness for Health (2)
 HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)
 or any PAC course (1–2)
 PSY 201, PSY 202. *General Psychology (3,3)
 WR 121. *English Composition (3)
 Speech (3)
 Mathematics at least through MTH 112, *Elementary Functions (4)
 Baccalaureate core courses and/or electives (10)

Sophomore Year (40–44)

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)
 CH 331, CH 332, CH 337. Organic Chemistry and Lab (4,4,4)
 ST 201. Principles of Statistics (4)
 ST 202. Principles of Statistics (4) (*recommended*)
 SOC 206. *Social Problems and Issues (3)
 or SOC 204. *Introduction to Sociology (3)
 WR 222. *English Composition (3)
 Baccalaureate core courses and/or electives (6)

Junior Year (45)

EXSS 322. Anatomical Kinesiology (4)
 EXSS 323. Biomechanics of Sport and Exercise (4)
 PH 201, PH 202, PH 203. *General Physics (5,5,5)
 WR 323. *English Composition (3) (*recommended*)

Z 331, Z 332, Z 333. Human Anatomy and Physiology (3,3,3)
 Z 341, Z 342, Z 343. Human Anatomy and Physiology Lab (2,2,2)
 Baccalaureate core courses and/or electives (4)

Senior Year (45)

BI 311. Genetics (4)
 BI 314. Cell and Molecular Biology (4)
 EXSS 324. Exercise Physiology (4)
 EXSS 411. Movement Skill Learning and Control (3)
 H 312. *AIDS and Sexually Transmitted Disease in Modern Society (3)
 H 320. Introduction to Human Disease (3)
 MB 302. General Microbiology (3)
 PSY 350. Human Lifespan Development (4)
 PSY 381. Abnormal Psychology (4)
 Baccalaureate core courses and/or electives (9)

Choose 4 credits of WIC from the following:

HSTS 415. ^*Theory of Evolution and Foundation of Modern Biology (4)
 HSTS 417. ^*History of Medicine (4)
 HSTS 419. ^*Studies in Scientific Controversy: Methods and Practices (4)
 HSTS 422. ^*Historical Studies of Science and Politics (4)
 HSTS 425. ^*History of the Life Sciences (4)

Total=180**PRE-PHYSICIAN ASSISTANT OPTION***Ariella Wolf, Chief Advisor*

The College of Science offers a preparatory program designed to meet **most** general requirements for admission to many physician assistant schools. Students who complete the four-year pre-physician assistant program earn a BS degree in General Science with a Pre-physician Assistant option. Satisfactory completion of the OSU course work facilitates, but does not guarantee, admission to a physician assistant school; applicants are selected on a competitive basis and extensive clinical experience in a health care setting is required. Students are urged to carefully check admission requirements at their schools of interest and work closely with admission representatives in order to make sure they are meeting all requirements.

First Year (45)

EXSS 132. Introduction to the Allied Health Professions (1)
 CH 121, CH 122, CH 123. *General Chemistry (5,5,5)
 or CH 231, CH 232, CH 233. *General Chemistry (4,4,4)
 and CH 261, CH 262, CH 263.
 *Laboratory for Chemistry 231, 232, 233 (1,1,1)
 HHS 231. *Lifetime Fitness for Health (2)
 HHS 241–HHS 248. *Lifetime Fitness: (various activities) (1)
 or any PAC course (1–2)
 MTH 111. *College Algebra (4)
 MTH 112. *Elementary Functions (4)
 PSY 201, PSY 202. *General Psychology (3,3)
 WR 121. *English Composition (3)

Speech (3)
 Baccalaureate core courses and electives (6)

Sophomore Year (45)

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)
 CH 331, CH 332, CH 337. Organic Chemistry and Lab (4,4,4)
 ST 201, ST 202. Principles of Statistics (4,4)
 SOC 206. *Social Problems and Issues (3)
 or SOC 204. *Introduction to Sociology (3)
 WR II. *English Composition (3)
 Baccalaureate core courses and electives (9)

Junior Year (45)

H 312. *AIDS and Sexually Transmitted Diseases in Modern Society (3)
 H 320. Introduction to Human Disease (3)
 PH 201, PH 202, PH 203. *General Physics (5,5,5)
 PSY 350. Human Lifespan Development (4)
 PSY 381. Abnormal Psychology (4)
 Z 331, Z 332, Z 333. Human Anatomy and Physiology (3,3,3)
 Z 341, Z 342, Z 343. Human Anatomy and Physiology Lab (2,2,2)
 Elective (1)

Senior Year (45)

Pre-approved upper-division science, psychology or health (9) excluding internship, practicum special/selected topics courses and courses with 399, 499, and 401–410 numbers.
 BB 350. Elementary Biochemistry (4)
 or BB 450, BB 451. General Biochemistry (4,3)
 BI 311. Genetics (4)
 BI 314. Cell and Molecular Biology (4)
 MB 302, MB 303. General Microbiology and Lab (3,2)
 PHAR 210. Terminology of the Health Sciences (2)
 Baccalaureate core courses and electives (10)
Choose 4 credits of WIC from the following:
 HSTS 415. ^*Theory of Evolution and Foundation of Modern Biology (4)
 HSTS 417. ^*History of Medicine (4)
 HSTS 419. ^*Studies in Scientific Controversy: Methods and Practices (4)
 HSTS 422. ^*Historical Studies of Science and Politics (4)
 HSTS 425. ^*History of the Life Sciences (4)

Total=180**PRE-PODIATRY OPTION***Chere Pereira, Chief Advisor*

Podiatry is a growing and challenging health profession that focuses on the care of the human foot and leg. Podiatrists prevent, diagnose, and treat diseases and disorders of the foot through both medical and surgical methods.

Students wishing to become podiatrists attend a four-year postbaccalaureate training program leading to a Doctor of Podiatric Medicine (DPM) at one of eight schools of podiatric medicine in the United States. These schools are located in Arizona, California, Florida, Illinois, Iowa, New York, Ohio, and Pennsylvania. To practice in Oregon, a DPM must also

take the qualifying examination administered by the State Board of Podiatric Examiners.

Before entering a school of podiatric medicine, students must first complete four years of undergraduate study and fulfill entrance requirements to the school of their choice (note that most podiatry schools require 3 quarters of English/writing). Students who enroll in the Pre-Podiatry option will receive a BS degree in General Science upon completion of the curriculum shown below. The preparatory program at OSU will satisfy requirements for entrance to most podiatry schools.

First Year

CH 231, CH 232, CH 233. *General Chemistry (4,4,4)
and CH 261, CH 262, CH 263.
 *Laboratory for Chemistry 231, 232, 233 (1,1,1)
 Math Sciences at least through MTH 112, *Elementary Functions, (8)
 Baccalaureate core courses and electives (16)
 Speech (3)
 WR 121. *English Composition (3)

Sophomore Year

CH 331, CH 332, CH 337. Organic Chemistry and Lab (4,4,4)
 BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)
 ST 201, ST 202. Principles of Statistics (4,4)
 or ST 351, ST 352. Introduction to Statistical Methods (4,4)
 Writing II (3)
 Baccalaureate core courses and electives (10–12)

Junior Year

BB 450, BB 451. General Biochemistry and Lab (4,3)
 or BB 350. Elementary Biochemistry (4)
 BI 311. Genetics (4)
 BI 314. Cell and Molecular Biology (4)
 PH 201, PH 202, PH 203. *General Physics (5,5,5)
 Baccalaureate core courses and electives (12)

Choose 4 credits of WIC from the following:

HSTS 415. ^*Theory of Evolution and Foundation of Modern Biology (4)
 HSTS 417. ^*History of Medicine (4)
 HSTS 425. ^*History of the Life Sciences (4)

Senior Year

Courses should be planned in consultation with student's advisor; graduation in the General Science major with the Pre-Podiatry option requires a total of 36 credits of upper-division science, to include at least two courses in anatomy, physiology, histology, or embryology.

PRE-VETERINARY MEDICINE OPTIONShawna Harvey, *Chief Advisor*

The College of Science offers a pre-professional program for students who wish to pursue careers in veterinary medicine. This program, especially tailored to the Oregon State University College of Veterinary Medicine, also meets admission requirements for most schools of veterinary medicine in the country.

Pre-veterinary students may major in general science or any other discipline while completing the admission requirements for veterinary school. Scientific disciplines such as biology, microbiology, or zoology are most frequently chosen, but areas outside of science also are acceptable. A student who is accepted into a veterinary school after three years of pre-professional work can apply up to 48 credits of the first year of professional study toward completion of a bachelor's degree in biology, general science, or zoology from OSU.

Admission to schools of veterinary medicine is competitive, and completion of the pre-veterinary requirements facilitates but does not guarantee acceptance. Admission committees look for a combination of academic ability and personal characteristics. Academic ability includes both the grades received in college courses and test scores. Additional information regarding application and professional education may be found in the Veterinary Medicine section of this catalog.

All science courses required for veterinary school admission must be taken for a letter grade. The following courses are required for a Bachelor of Science degree in General Science with a Pre-Veterinary Medicine option.

First Year

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

CH 121, CH 122, CH 123. General Chemistry (5,5,5)

or CH 231, CH 232, CH 233. *General Chemistry (4,4,4)

and CH 261, CH 262, CH 263.

*Laboratory for Chemistry 231, 232, 233 (1,1,1)

MTH 251, *Differential Calculus (4)

VMB 110. Preveterinary Medicine (1)
(*Recommended*)

Speech (3)

WR 121. *English Composition (3)

Baccalaureate core courses and electives (3)

Sophomore YearANS 121. *Introduction to Animal Science (4) (*Recommended*)

BI 314. Cell and Molecular Biology (4)

CH 331, CH 332, CH 337. Organic Chemistry and Lab (4,4,4)

PH 201, PH 202, PH 203. *General Physics (5,5,5)

Take 4 credits of Statistics:

ST 201. Principles of Statistics (4)

or ST 351. Introduction to Statistical Methods (4)

Additional math, computer science or statistics (4)

Electives (3)

Writing II (3)

Junior/Senior Year

ANS 311. Principles of Animal Nutrition (3)

BB 450, BB 451. General Biochemistry (4,3)

BI 311. Genetics (4)

One of the following courses in animal or human physiology (3-4):

Z 331. Human Anatomy and Physiology (3)

Z 430. Principles of Physiology (4)

Z 431. Vertebrate Physiology (4)

A minimum of at least 6 additional credits of upper-division biological science courses with at least one laboratory.

Recommended courses include:

additional biochemistry, additional physiology and/or anatomy, animal reproduction, cell biology, cell physiology, epidemiology, histology, immunology, microbiology, parasitology, or virology (does not include Z 410) (6).

Choose 4 credits of WIC from the following:

HSTS 415. ^Theory of Evolution and Foundation of Modern Biology (4)

HSTS 417. ^History of Medicine (4)

HSTS 419. ^Studies in Scientific

Controversy: Methods and Practices (4)

HSTS 422. ^Historical Studies of Science and Politics (4)

HSTS 425. ^History of the Life Sciences (4)

Additional courses to total a minimum of 38 credits in upper-division science courses from the College of Science.

Baccalaureate core courses and electives (61-64)

Experience with animals, such as Z 410, Occupational Internship (1-16), is highly recommended.

A bachelor's degree is no longer required to obtain the DVM from Oregon State University's College of Veterinary Medicine. See the College of Veterinary Medicine for the general education prerequisites if the applicant will not have a bachelor's degree upon entering veterinary school.

COURSES

GS 199. SPECIAL STUDIES (1-16). This course is repeatable for a maximum of 16 credits.

GS 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

GS 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

GS 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

GS 407. SEMINAR (1-16). One-credit sections. Graded P/N. This course is repeatable for a maximum of 16 credits.

GS 410. SCIENCE INTERNSHIP (1-12). Supervised scientific work experience at selected cooperating institutions, agencies, laboratories, or companies. Graded P/N. This course is repeatable for a maximum of 12 credits. **PREREQS:** Upper-division standing in appropriate major.

MATHEMATICS**Thomas Dick, Chair**298B Kidder Hall
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541-737-5138Email: tpdick@math.oregonstate.edu
Website: <http://www.math.oregonstate.edu/>**FACULTY****Professors** Bogley, Burton, De Leenheer, Dick, Dray, Faridani, Finch, Flahive, Higdon, Osslander, Peszynska, Pohjanpelto, Schmidt, Showalter, Thomann, Waymire**Associate Professors** Bokil, Escher, Kovchegov, Swisher**Assistant Professors** Beisiegel, Cozzi, Dascaluic, Gibson, Guo, Koslicki, Lockwood, Petsche**Adjunct Professors** Batten (ME), Manogue (PH)**Adjunct Associate Professor** Zhang (ECE)**Adjunct Assistant Professor** Medlock (VBS)**Undergraduate Major****Mathematics (BS, CRED, HBS)****Option***Secondary Teaching Emphasis
Statistics***Minors****Actuarial Science
Mathematics****Graduate Major****Mathematics (MA, MAIS, MS, PhD)****Graduate Areas of Concentration**
*Actuarial Science**Algebra**Analysis**Applied Mathematics**Computational Mathematics**Differential Equations**Financial Mathematics**Geometry**Mathematics Education**Number Theory**Numerical Analysis**Topology**Probability***Graduate Minor
Mathematics**

The department offers programs leading to the BS, MA, MS, and PhD degrees in Mathematics. Undergraduate minors are offered in Mathematics and Actuarial Science.

Students interested in teaching mathematics at the secondary level should contact a departmental advisor and

discuss the Secondary Teaching Emphasis option available under the Mathematics major. Likewise, students interested in careers in the area of financial mathematics or as actuaries should meet with a member of the departmental Actuarial Sciences Committee.

Additional information pamphlets about both the undergraduate and graduate programs are available on the Department of Mathematics website.

The Mathematics major requirements at the upper division comprise about 45 credits of course work. This leaves about 45 credits of free electives that can be used to design a degree program in mathematics that is tailored to each major's particular interests.

UNDERGRADUATE MAJORS WITH OPTIONS**MATHEMATICS (BS, CRED, HBS)**

The BS degree in Mathematics requires a common core of courses at the lower-division level and junior-level followed by senior-level breadth courses allowing for some individual choice. The upper-division requirements in the major total 45 credits. Thus, a mathematics major has ample opportunity to take further mathematics courses focused toward specific interests and career goals. Interdisciplinary programs with other departments are strongly encouraged.

What follows are the requirements for the BS degree in Mathematics together with a suggested timeline.

Freshman Year (45)

MTH 251. *Differential Calculus (4)

MTH 252. Integral Calculus (4)

MTH 253. Infinite Series and Sequences (4)

PH 211. *General Physics with Calculus (4)

Baccalaureate core courses (29)

Sophomore Year (45)

MTH 254. Vector Calculus I (4)

MTH 255. Vector Calculus II (4)

MTH 256. Applied Differential Equations (4)

MTH 341. Linear Algebra (3)

Baccalaureate core courses (13)

Other electives (17)

Junior Year (45)

A grade of at least C– and a GPA of 2.25 are required in all upper-division mathematics courses used to fulfill degree requirements.

MTH 311, MTH 312. Advanced Calculus (4,4)

MTH 342. Linear Algebra II (4)

MTH 343. Introduction to Modern Algebra (3)

MTH 355. Discrete Mathematics (3)

Select one course from the following courses (WIC) (3):

MTH 323. ^Mathematical Modeling (3)

MTH 333. ^Fundamental Concepts of Topology (3)

MTH 338. ^Non-Euclidean Geometry (3)

Baccalaureate core courses (6)

Other electives (18)

Senior Year (45)**Five courses from the following (15):**

MTH 430. Metric Spaces and Topology (3)

MTH 434. Introduction to Differential Geometry (3)

MTH 440. Computational Number Theory (3)

MTH 451. Numerical Linear Algebra (3)

MTH 463. Probability I (3)

MTH 480. Systems of Ordinary Differential Equations (3)

MTH 483. Mathematical Methods for Engineers and Scientists (3)

Two additional courses selected from below (6):

Non-blanket numbered (not X99- or X0X-numbered) upper-division MTH courses, 400-level ST courses, or other courses of a mathematical nature approved by the departmental head advisor. MTH 390 is not allowed.

Electives (24)

Total=180**OPTIONS****SECONDARY TEACHING EMPHASIS OPTION**

Students preparing for careers teaching mathematics at the secondary level may major in mathematics with the following transcript-visible option. This option helps prepare students to pursue a teaching licensure program in their fifth year. Option requirements and a suggested timeline follow.

Freshman Year (45)

MTH 251. *Differential Calculus (4)

MTH 252. Integral Calculus (4)

MTH 253. Infinite Series and Sequences (4)

PH 211. *General Physics with Calculus (4)

Baccalaureate core courses (29)

Sophomore Year (45)

MTH 254. Vector Calculus I (4)

MTH 255. Vector Calculus II (4)

MTH 256. Applied Differential Equations (4)

MTH 341. Linear Algebra (3)

Baccalaureate core courses (13)

Other electives (17)

Junior Year (45)

A grade of at least C– and a GPA of 2.25 are required in all upper-division mathematics courses used to fulfill degree requirements.

MTH 311, MTH 312. Advanced Calculus (4,4)

MTH 338. ^Non-Euclidean Geometry (3)

MTH 342. Linear Algebra II (4)

MTH 343. Introduction to Modern Algebra (3)

MTH 355. Discrete Mathematics (3)

MTH 361. Introduction to Probability (3)

TCE 309. Field Practicum (3)

Baccalaureate core courses (6)

Other electives (12)

Senior Year (45)

MTH 491, MTH 492, MTH 493. Algebra and Geometric Transformations (3,3,3)

SED 414. Inquiry in Mathematics and Mathematics Education (3)

ST 351. Introduction to Statistical Methods (4)

Electives (29)

- Students wanting a stronger background in statistics may substitute ST 421 for ST 351.
- Students wanting a stronger background in probability may substitute MTH 463, Probability I, (usually taken in the senior year) for MTH 361.
- Students wanting a stronger background in mathematics should choose some electives from the seven senior courses listed above in the Mathematics major.

STATISTICS OPTION

The Statistics option offers Mathematics majors an opportunity to concentrate their senior level course work in the area of statistics and probability after completing core junior and lower-division mathematics requirements. This degree option is designed to allow a focus on the study of the mathematical theory underlying statistics while simultaneously developing expertise in statistical applications.

The following upper-division requirements for the Statistics option are in place of the required five (from a list of seven) 400-level classes and the additional two upper-division math, 400-level statistics, or other approved courses of a mathematical nature that are specified in the BS in Mathematics.

Required

- MTH 463. Probability I (3)
 MTH 464. Probability II (3)
 ST 411. Methods of Data Analysis (4)
 ST 412. Methods of Data Analysis (4)
 ST 421. Introduction to Mathematical Statistics (4)
 ST 422. Introduction to Mathematical Statistics (4)

One course from the following list is required:

- MTH 465. Probability III (3)
 MTH 467. Actuarial Mathematics (3)
 ST 413. Methods of Data Analysis (4)
 ST 415. Design and Analysis of Planned Experiments (3)
 ST 431. Sampling Methods (3)
 ST 439. Survey Methods (3)
 ST 441. Probability, Computing, and Simulation in Statistics (4)
 ST 443. Applied Stochastic Models (3)

Two courses from the following list are required:

- MTH 351. Introduction to Numerical Analysis (3)
 or MTH 451. Numerical Linear Algebra (3)
 MTH 411. Real Analysis (3)
 MTH 430. Metric Spaces and Topology (3)
 MTH 434. Introduction to Differential Geometry (3)
 MTH 440. Computational Number Theory (3)
 MTH 443. Abstract Linear Algebra (3)
 MTH 480. Systems of Ordinary Differential Equations (3)
 or MTH 481. Mathematical Methods for Engineers and Scientists (3)

- MTH 483. Mathematical Methods for Engineers and Scientists (3)
 MTH 499. Selected Topics: *Models and Methods of Applied Mathematics* (3)

UNDERGRADUATE MINORS

ACTUARIAL SCIENCE MINOR

Required (22)

- MTH 251. *Differential Calculus (4)
 MTH 252. Integral Calculus (4)
 MTH 253. Infinite Series and Sequences (4)
 or MTH 306. Matrix and Power Series Methods (4)
 MTH 254. Vector Calculus I (4)
 MTH 341. Linear Algebra I (3)
 MTH 361. Introduction to Probability (3)
Select at least 2 courses from the following upper-division courses (6–8):
 MTH 351. Introduction to Numerical Analysis (3)
 MTH 463. Probability I (3)
 MTH 464. Probability II (3)
 MTH 465. Probability III (3)
 MTH 467. Actuarial Mathematics (3)
 ST 411. Methods of Data Analysis (4)
 ST 412. Methods of Data Analysis (4)
 ST 413. Methods of Data Analysis (4)
 ST 421. Introduction to Mathematical Statistics (4)
 ST 422. Introduction to Mathematical Statistics (4)
 ST 441. Probability, Computing, and Simulation in Statistics (4)
 ST 443. Applied Stochastic Models (3)

Restriction: The Actuarial Science minor must include 28 credits, at least 12 of which must be upper-division credits.

- Except for MTH 306 and MTH 341, upper-division courses used to satisfy a student's major requirements may not also be used to satisfy requirements for the Actuarial Science minor.
- Except for MTH 306 and MTH 341, upper-division courses used to satisfy a student's additional minor program may not also be used to satisfy requirements for the Actuarial Science minor.

Total=28–30

MATHEMATICS MINOR

Required

- MTH courses numbered 231 or higher (30 credits)
 MTH courses numbered 311 or higher (15 credits)
 MTH 311. Advanced Calculus (4)
 or MTH 341. Linear Algebra I (3)

Strongly Recommended:

- MTH 251. *Differential Calculus (4)
 MTH 252. Integral Calculus (4)
 MTH 254. Vector Calculus I (4)

Note: MTH 390, Foundations of Elementary Mathematics (4), **may not be used** for credit in the Mathematics minor.

MATHEMATICS (MA, MS, PhD, MAIS)

Graduate Areas of Concentration

Actuarial science, algebra, analysis, applied mathematics, computational mathematics, differential equations, financial mathematics, geometry, mathematics education, number theory, numerical analysis, topology, probability

The Department of Mathematics offers graduate work leading to the Master of Science, Master of Arts, and Doctor of Philosophy degrees. Graduate areas of concentration are actuarial science, algebra, analysis, applied mathematics, computational mathematics, differential equations, financial mathematics, geometry, mathematics education, number theory, numerical analysis, topology, probability.

For the MS and MA, a thesis, an expository paper, or successful completion of the PhD qualifying examination is required.

MATHEMATICS GRADUATE MINOR

For more details, see the departmental advisor.

COURSES

MTH 065. ELEMENTARY ALGEBRA (3).

Arithmetic of signed numbers, order of operations, simplifying algebraic expressions, solution of linear equations, and inequalities. Rules of exponents, addition, subtraction, and multiplication of polynomials, factoring, solution of quadratic equations by factoring, reducing rational expressions. Word problems involving linear equations, graphing of linear equations, inequalities.

MTH 095. INTERMEDIATE ALGEBRA (3).

Addition, subtraction, multiplication, and division of rational expressions, long division of polynomials, solution of fractional equations, applications involving linear equations. Fractional equations, inequalities, literal equations, and variations. Negative and fractional exponents, radicals, solution of quadratic equations, and complex numbers. Cartesian coordinates, graphs of linear equations and inequalities, distance formula, slope, equations of lines, solutions of systems of linear equations in two unknowns and inequalities. **PREREQS:** MTH 065

MTH 102. ALGEBRAIC FOUNDATIONS (3).

This course is designed primarily for EOP students. They will use various computing technologies to explore realistic and interesting situations in which algebra is used. As they work through explorations, they will work with many of the fundamental ideas of algebra, ideas they will find important in their daily lives.

MTH 103. ALGEBRAIC REASONING (4).

A combination of cooperative learning and individual instruction is used to promote student development of algebraic reasoning processes and skills. **PREREQS:** Previous algebra course.

MTH 105. *INTRODUCTION TO CONTEMPORARY MATHEMATICS (3).

Elementary linear programming, combinatorics, descriptive statistics, elementary probability, exponential growth and decay, examples of major mathematical ideas and models. Lec/rec. (Bacc Core Course) **PREREQS:** MTH 095 or equivalent high school preparation.

MTH 111. *COLLEGE ALGEBRA (4). Polynomial equations and inequalities, polynomial functions and graphs, inverse functions, exponential and

logarithmic functions, elementary mathematical modeling and applications. Lec/rec. (Bacc Core Course) **PREREQS:** MTH 095 or equivalent high school preparation.

MTH 112. *ELEMENTARY FUNCTIONS (4). Triangle trigonometry, circular functions and graphs, trigonometric equations and identities, inverse trigonometric functions, polar coordinates, vectors and applications. Lec/rec. (Bacc Core Course) **PREREQS:** MTH 111

MTH 199. SPECIAL TOPICS (1-16). Maximum 3 credits per term, 9 credits total. Does not meet university group requirement in physical science. This course is repeatable for a maximum of 9 credits.

MTH 211. *FOUNDATIONS OF ELEMENTARY MATHEMATICS (4). Introduction to problem solving, sets, whole numbers, number theory, fractions, decimals, percent, ratio and proportion, integers. Intended primarily for prospective elementary teachers. (Bacc Core Course) **PREREQS:** (MTH 095 or MTH 103 or MTH 111 or MTH 112) or Placement Test or Placement Test

MTH 212. FOUNDATIONS OF ELEMENTARY MATHEMATICS (4). Rational and real numbers, probability, statistics, and informal geometry. **PREREQS:** MTH 211

MTH 231. ELEMENTS OF DISCRETE MATHEMATICS (4). Elementary logic and set theory, functions, direct proof techniques, contradiction and contraposition, mathematical induction and recursion, elementary combinatorics, basic graph theory, minimal spanning trees. **PREREQS:** Placement in MTH 251

MTH 232. ELEMENTS OF DISCRETE MATHEMATICS (4). Combinatorics, algorithms and complexity, graphs and trees. Lec/rec. **PREREQS:** MTH 231

MTH 241. *CALCULUS FOR MANAGEMENT AND SOCIAL SCIENCE (4). Elementary differential and integral calculus of polynomial, logarithmic, and exponential functions and their applications to business, management and social sciences. Lec/rec. (Bacc Core Course) **PREREQS:** (MTH 111 or MTH 112) or Placement Test and MTH 111

MTH 245. *MATHEMATICS FOR MANAGEMENT, LIFE, AND SOCIAL SCIENCES (4). Techniques of counting, probability and elements of statistics including binomial and normal distributions. Introductory matrix algebra. Elements of linear programming. Lec/rec. (Bacc Core Course) **PREREQS:** MTH 111

MTH 251. *DIFFERENTIAL CALCULUS (4). Differential calculus for engineers and scientists. Rates of change: the derivative, velocity, and acceleration. The algebraic rules of differential calculus and derivatives of polynomial, rational, and trigonometric functions. Maximum-minimum problems, curve sketching, and other applications. Antiderivatives and simple motion problems. (Bacc Core Course) **PREREQS:** MTH 112

MTH 251H. *DIFFERENTIAL CALCULUS (4). Differential calculus for engineers and scientists. Rates of change: the derivative, velocity, and acceleration. The algebraic rules of differential calculus and derivatives of polynomial, rational, and trigonometric functions. Maximum-minimum problems, curve sketching, and other applications. Antiderivatives and simple motion problems. (Bacc Core Course) **PREREQS:** MTH 112 and Honors College approval required.

MTH 252. INTEGRAL CALCULUS (4). Definite integrals, elementary applications to area, force, and work. Integral tables and basic techniques of integration, calculus of logarithmic and exponential functions, polar coordinates, applications to areas, volumes, force, work, and growth and decay problems. Lec/rec. **PREREQS:** MTH 251 or MTH 251H

MTH 252H. INTEGRAL CALCULUS (4). Definite integrals, elementary applications to area, force, and work. Integral tables and basic techniques of integration, calculus of logarithmic and exponential functions, polar coordinates, applications to areas, volumes, force, work, and growth and decay problems. **PREREQS:** (MTH 251 or MTH 251H) and Honors College approval required.

MTH 253. INFINITE SERIES AND SEQUENCES (4). Indeterminate forms. Improper integrals. Sequences and series, especially Taylor's formula and power series. Applications to numerical estimation with error analysis. Series with complex terms and the Euler identities. Lec/rec. **PREREQS:** MTH 252

MTH 254. VECTOR CALCULUS I (4). Vectors, vector functions, and curves in two and three dimensions. Surfaces, partial derivatives, gradients, and directional derivatives. Multiple integrals in rectangular, polar, cylindrical, and spherical coordinates. Physical and geometric applications. Lec/rec. **PREREQS:** MTH 252 or MTH 252H

MTH 254H. VECTOR CALCULUS I (4). Vectors, vector functions, and curves in two and three dimensions. Surfaces, partial derivatives, gradients, and directional derivatives. Multiple integrals in rectangular, polar, cylindrical, and spherical coordinates. Physical and geometric applications. Lec/rec. **PREREQS:** (MTH 252 or MTH 252H) and Honors College approval required.

MTH 255. VECTOR CALCULUS II (4). Brief review of vector functions, space curves, gradients, and directional derivatives. Introduction to vector analysis: vector fields, divergence, curl, line integrals, surface integrals, conservative fields, and the theorems of Gauss and Stokes with applications to force, work, mass, and charge. Lec/rec. **PREREQS:** MTH 254

MTH 255H. VECTOR CALCULUS II (4). Brief review of vector functions, space curves, gradients, and directional derivatives. Introduction to vector analysis: vector fields, divergence, curl, line integrals, surface integrals, conservative fields, and the theorems of Gauss and Stokes with applications to force, work, mass, and charge. **PREREQS:** MTH 254 and Honors College approval required.

MTH 256. APPLIED DIFFERENTIAL EQUATIONS (4). First order linear and nonlinear equations, and second order linear equations. Applications to electric circuits and mechanical oscillators. Introduction to the Laplace transform and higher order equations. Solution methods and applications appropriate for science and engineering. (Familiarity with complex numbers and Euler's identities is highly desirable.) Lec/rec. **PREREQS:** (MTH 254 or MTH 254H) or instructor approval required.

MTH 256H. APPLIED DIFFERENTIAL EQUATIONS (4). First order linear and nonlinear equations, and second order linear equations. Applications to electric circuits and mechanical oscillators. Introduction to the Laplace transform and higher order equations. Solution methods and applications appropriate for science and engineering. (Familiarity with complex numbers and Euler's identities is highly desirable.) **PREREQS:** (MTH 254 or MTH 254H) or instructor approval required. Honors College approval required.

MTH 268. MATHEMATICAL IDEAS IN BIOLOGY (4). Mathematical models of biological systems, with emphasis on population dynamics and ecology. Integral calculus with applications to biology. **PREREQS:** MTH 251

MTH 299. SPECIAL TOPICS (1-16). Maximum 3 credits per term, 9 credits total. This course is repeatable for a maximum of 9 credits.

MTH 306. MATRIX AND POWER SERIES METHODS (4). Introduction to matrix algebra, determinants, systematic solution to linear

systems, and eigenvalue problems. Convergence and divergence of series with emphasis on power series, Taylor series expansions, convergence tests for power series, and error estimates for truncated series used in practical approximations. Lec/rec. **PREREQS:** (MTH 252 or MTH 252H)

MTH 306H. MATRIX AND POWER SERIES METHODS (4). Introduction to matrix algebra, determinants, systematic solution to linear systems, and eigenvalue problems. Convergence and divergence of series with emphasis on power series, Taylor series expansions, convergence tests for power series, and error estimates for truncated series used in practical approximations. Lec/rec. **PREREQS:** (MTH 252 or MTH 252H) and Honors College approval required.

MTH 311. ADVANCED CALCULUS (4). Rigorous development of calculus, axiomatic properties of \mathbb{R} , topology of the real line, convergence of sequences and series of real numbers, functions, limits of functions, basic properties of continuity and derivatives. Brief treatment of Riemann integration, improper integrals, sequences of functions, pointwise and uniform convergence, introductory aspects of multivariable calculus. **PREREQS:** Completion of lower-division calculus sequence (MTH 251 through MTH 255) and MTH 355, Discrete Mathematics.

MTH 312. ADVANCED CALCULUS (4). Rigorous development of calculus, axiomatic properties of \mathbb{R} , topology of the real line, convergence of sequences and series of real numbers, functions, limits of functions, basic properties of continuity and derivatives. Brief treatment of Riemann integration, improper integrals, sequences of functions, pointwise and uniform convergence, introductory aspects of multivariable calculus. **PREREQS:** MTH 311. Concurrent enrollment in MTH 342.

MTH 323. *MATHEMATICAL MODELING (3). A variety of mathematical modeling techniques will be introduced. Students will formulate models in response to practical problems drawn from the literature of ecology, environmental sciences, engineering or other fields. Informal writing assignments in class and formal written presentation of the models will be required. (Writing Intensive Course) **PREREQS:** MTH 256 and MTH 341 or instructor approval.

MTH 333. *FUNDAMENTAL CONCEPTS OF TOPOLOGY (3). Open and closed sets, continuity, compactness, connectedness, winding number, fixed point theorems in the plane. (Writing Intensive Course) **PREREQS:** MTH 341 or MTH 355

MTH 338. *NON-EUCLIDEAN GEOMETRY (3). Introduction to non-Euclidean geometries. Selected topics such as hyperbolic and elliptic geometry, spherical geometry, projective geometry, geometries arising from alternative metrics. (Writing Intensive Course) **PREREQS:** MTH 252

MTH 341. LINEAR ALGEBRA I (3). Matrix algebra, determinants, systems of linear equations, computational aspects of eigenvalues and eigenvectors. **PREREQS:** MTH 254

MTH 342. LINEAR ALGEBRA II (4). Vector spaces, linear transformations, inner product spaces, orthogonality, eigenvalues, diagonalization. **PREREQS:** MTH 341

MTH 343. INTRODUCTION TO MODERN ALGEBRA (3). Introduction to rings and fields with an emphasis on the integers and polynomial rings; selected applications. **PREREQS:** MTH 341 and MTH 355

MTH 351. INTRODUCTION TO NUMERICAL ANALYSIS (3). Introduction to the computation of approximate solutions to mathematical problems that cannot be solved by hand: analysis of errors; rootfinding for nonlinear equations in one variable; interpolation of functions; numerical integration. **PREREQS:** MTH 253 or MTH 306 and programming experience.

MTH 355. DISCRETE MATHEMATICS (3). For mathematics majors beginning upper-division mathematics course work. Topics include elementary combinatorics and basic counting principles such as the sum, product, pigeonhole, and bijection principles; mathematical induction; equivalence relations; introductory aspects of graph theory; generating functions; and the inclusion-exclusion principle. **PREREQS:** MTH 253 required and MTH 341 recommended.

MTH 361. INTRODUCTION TO PROBABILITY (3). Probability problem solving using concepts developed in calculus. Topics include probability models, discrete and continuous random variables, expectation and variance, the law of large numbers, and the central limit theorem. **PREREQS:** MTH 253 or MTH 306

MTH 361H. INTRODUCTION TO PROBABILITY (3). Probability problem solving using concepts developed in calculus. Topics include probability models, discrete and continuous random variables, expectation and variance, the law of large numbers, and the central limit theorem. **PREREQS:** MTH 253 or MTH 306 and Honors College approval required.

MTH 390. FOUNDATIONS OF ELEMENTARY MATHEMATICS (4). Measurement, congruence, similarity, coordinate and transformational geometry. **PREREQS:** MTH 212 and MTH 212

MTH 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MTH 399H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

MTH 401. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MTH 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MTH 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MTH 406. PROJECTS (1-3). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MTH 407. SEMINAR (3). This course is repeatable for a maximum of 99 credits. **PREREQS:** Departmental approval required.

MTH 410. OCCUPATIONAL INTERNSHIP (3-12). Planned and supervised training experience at selected government, industrial, or business placement sites. Must be followed by a one-hour post-internship seminar. Consult departmental head advisor. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Junior standing in mathematics, cumulative 3.00 GPA in mathematics, head advisor/departmental approval required.

MTH 411. REAL ANALYSIS (3). Topological concepts in metric, normed, and inner-product spaces. Properties of continuous functions, including the Stone-Weierstrass theorem. Introduction to function spaces, contraction mappings, fixed points, and applications. Lebesgue measure and integration in one and several variables, basic convergence theorems, Lebesgue spaces, Fubini's theorem, and applications to Fourier transforms and probability. **PREREQS:** MTH 312 and MTH 341

MTH 412. REAL ANALYSIS (3). Topological concepts in metric, normed, and inner-product spaces. Properties of continuous functions, including the Stone-Weierstrass theorem. Introduction to function spaces, contraction mappings, fixed points, and applications. Lebesgue measure and integration in one and several variables, basic convergence theorems, Lebesgue spaces, Fubini's theorem, and

applications to Fourier transforms and probability. **PREREQS:** MTH 411 or MTH 511

MTH 413. REAL ANALYSIS (3). Topological concepts in metric, normed, and inner-product spaces. Properties of continuous functions, including the Stone-Weierstrass theorem. Introduction to function spaces, contraction mappings, fixed points, and applications. Lebesgue measure and integration in one and several variables, basic convergence theorems, Lebesgue spaces, Fubini's theorem, and applications to Fourier transforms and probability. **PREREQS:** MTH 412 or MTH 512

MTH 430. METRIC SPACES AND TOPOLOGY (3). Fundamental notions of metric space topology. Examples of Euclidean, non-Euclidean and other fundamental metric spaces including the Hilbert Cube and two-dimensional surfaces. Characterization and classification results for metric spaces. Selected applications of topology, possibly including the structure of molecules and/or networks. **PREREQS:** MTH 342 or MTH 355 and /or instructor approval. MTH 311 is recommended.

MTH 434. INTRODUCTION TO DIFFERENTIAL GEOMETRY (3). Curves and surfaces in Euclidean space; geodesics; curvature; introduction to tensor algebra and differential forms; selected applications. **PREREQS:** MTH 312 and MTH 342

MTH 435. DIFFERENTIAL GEOMETRY (3). Differentiable 2-manifolds; curvature; geodesics; tensor algebra and the algebra of exterior differential forms with emphasis on Euclidean space; differentiation of tensors and forms; integration of forms; selected applications. **PREREQS:** (MTH 434 or MTH 534) or instructor approval required.

MTH 436. DIFFERENTIAL GEOMETRY (3). Differentiable 2-manifolds; curvature; geodesics; tensor algebra and the algebra of exterior differential forms with emphasis on Euclidean space; differentiation of tensors, and forms; integration of forms; selected applications. **PREREQS:** (MTH 435 or MTH 535) or instructor approval required.

MTH 437. GENERAL RELATIVITY (3). Geometry of special relativity. Tensor analysis, metrics, geodesics, curvature. Einstein field equations, cosmological models, black holes. Selected topics such as global structure, conserved quantities, spinors. **PREREQS:** MTH 311. MTH 434 or MTH 534 is recommended.

MTH 440. COMPUTATIONAL NUMBER THEORY (3). Development of the number theory used in some basic tests of primality and methods of factoring integers. Applications to cryptology. **PREREQS:** MTH 231 or MTH 343 or MTH 355

MTH 441. APPLIED AND COMPUTATIONAL ALGEBRA (3). Applications of fundamental algebraic systems to topics such as factorization of polynomials, finding roots of polynomials, error correcting codes. **PREREQS:** MTH 342 or (MTH 440 or MTH 540) or instructor approval required.

MTH 442. APPLIED AND COMPUTATIONAL ALGEBRA (3). Applications of fundamental algebraic systems to topics such as factorization of polynomials, finding roots of polynomials, error correcting codes. **PREREQS:** MTH 441 or MTH 541 or instructor approval required.

MTH 443. ABSTRACT LINEAR ALGEBRA (3). Abstract vector spaces. Linear transformations, eigenvalues and eigenvectors, the Jordan canonical form, inner product spaces. **PREREQS:** MTH 342 and MTH 343

MTH 451. NUMERICAL LINEAR ALGEBRA (3). Computation of solutions of linear systems using direct and iterative methods; least-squares solution of overdetermined systems; computation of eigenvalues and eigenvectors. **PREREQS:** MTH 341 and programming experience or instructor approval required. MTH 342 and MTH 351 are recommended.

MTH 452. NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS (3). Numerical solution of initial-value problems using Runge-Kutta methods and linear multistep methods; introduction to boundary-value problems. Analysis of stability, accuracy, and implementation of methods. **PREREQS:** MTH 256 and (MTH 451 or MTH 551) or instructor approval required.

MTH 453. NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS (3). Numerical solution of boundary value problems and initial-boundary value problems using finite difference and finite element methods. Analysis of stability, accuracy, and implementation of methods. **PREREQS:** (MTH 452 or MTH 552) or instructor approval required.

MTH 463. PROBABILITY I (3). An introduction to probability theory; topics covered include: the axioms of probability, probability spaces and models, independence, random variables; densities, distributions, expectation, and variance; probability inequalities, the law of large numbers, and the binomial central limit theorem. **PREREQS:** MTH 312 or instructor approval required.

MTH 464. PROBABILITY II (3). Transformations of random variables; sums of independent random variables, generating functions, characteristic functions, the central limit theorem and other weak limit theorems. **PREREQS:** (MTH 463 or MTH 563) and MTH 341 or instructor approval required.

MTH 465. PROBABILITY III (3). Random variables, central limit theorem; distributions of standard statistics; Markov chains, continuous and discontinuous stochastic processes. **PREREQS:** (MTH 464 or MTH 564) or instructor approval required.

MTH 467. ACTUARIAL MATHEMATICS (3). Foundations of actuarial science from the point of view of mathematical models that arise in the design and management of insurance systems. Most models will be life insurance based. **PREREQS:** (MTH 463 or MTH 563) or ST 421 or instructor approval required.

MTH 480. SYSTEMS OF ORDINARY DIFFERENTIAL EQUATIONS (3). Systems of two first-order differential equations, phase portraits, linearization and the stability of equilibria, conservative systems, reversible systems, limit cycles and the Poincare-Bendixson Theorem. Additional topics selected from Hamiltonian systems, Hopf bifurcation or Lorenz equations and chaos. MTH 480 and MTH 481 cannot both be taken for credit. **PREREQS:** (MTH 256 or MTH 256H) and MTH 341

MTH 481. MATHEMATICAL METHODS FOR ENGINEERS AND SCIENTISTS (3). Linear and nonlinear systems of ordinary differential equations, elementary stability theory, higher order equations, boundary value problems, series solution of ordinary differential equations. **PREREQS:** MTH 256

MTH 482. MATHEMATICAL METHODS FOR ENGINEERS AND SCIENTISTS (3). Partial differential equations, Bessel's and Legendre's equations, Fourier analysis, separation of variables, transform methods. **PREREQS:** MTH 481 or consent of instructor.

MTH 483. MATHEMATICAL METHODS FOR ENGINEERS AND SCIENTISTS (3). Introduction to the complex differential and integral calculus: Cauchy's theorem and formula, the residue calculus, power series and Laurent series, harmonic functions, conformal mapping, and applications. **PREREQS:** MTH 256 or MTH 256H and MTH 256

MTH 490. INTENSIVE SUMMER RESEARCH IN MATHEMATICS (12). Combination of seminar, lectures, and individual research projects designed to introduce students to research mathematics. This course is repeatable for a maximum of 99 credits. **PREREQS:** Open to participants in the OSU Undergraduate Summer Research Program in Mathematics (REU program).

MTH 491. ALGEBRA AND GEOMETRIC TRANSFORMATIONS (3). Ordered fields, number systems (natural, integer, rational, real, and complex), fundamental theorems of arithmetic and algebra, algebraic and transcendental numbers, constructible points and numbers and the classical geometric constructions, Polya's problem solving heuristics and strategies. Intended primarily for prospective mathematics teachers. **PREREQS:** MTH 341

MTH 492. ALGEBRA AND GEOMETRIC TRANSFORMATIONS (3). Major results of Euclidean geometry, axiom systems for Euclidean geometry, dependency tree of Euclidean theorems, groups of geometric transformations with applications to symmetries of plane and solid objects, Euler's formula, tilings and tessellations, isometries and similitudes of the plane (translations, rotations, reflections, glide reflections, dilations). Intended primarily for prospective mathematics teachers. **PREREQS:** MTH 491 or MTH 591

MTH 493. ALGEBRA AND GEOMETRIC TRANSFORMATIONS (3). Geometric transformations as real, complex, and matrix functions, invariants and genealogy of geometric transformations, extensions to transformations of the sphere and of three-dimensional space, selected applications chosen from fractals, analysis of frieze and crystallographic patterns, problem solving, groups of symmetries, computer graphics, and the use of dynamic geometry software. Intended primarily for prospective mathematics teachers. **PREREQS:** MTH 492 or MTH 592

MTH 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MTH 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MTH 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

MTH 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MTH 506. PROJECTS (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MTH 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MTH 508. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MTH 510. OCCUPATIONAL INTERNSHIP (3-12). Planned and supervised training experience at selected government, industrial, or business placement sites. Must be followed by a one-hour post-internship seminar. Consult departmental head advisor. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MTH 511. REAL ANALYSIS (3). Topological concepts in metric, normed, and inner-product spaces. Properties of continuous functions, including the Stone-Weierstrass theorem. Introduction to function spaces, contraction mappings, fixed points, and applications. Lebesgue measure and integration in one and several variables, basic convergence theorems, Lebesgue spaces, Fubini's theorem, and applications to Fourier transforms and probability. **PREREQS:** MTH 312 and MTH 341

MTH 512. REAL ANALYSIS (3). Topological concepts in metric, normed, and inner-product spaces. Properties of continuous functions, including the Stone-Weierstrass theorem. Introduction to function spaces, contraction mappings, fixed points, and applications.

Lebesgue measure and integration in one and several variables, basic convergence theorems, Lebesgue spaces, Fubini's theorem, and applications to Fourier transforms and probability. **PREREQS:** MTH 411 or MTH 511

MTH 513. REAL ANALYSIS (3). Topological concepts in metric, normed, and inner-product spaces. Properties of continuous functions, including Stone-Weierstrass theorem. Introduction to function spaces, contraction mappings, fixed points, and applications. Lebesgue measure and integration in one and several variables, basic convergence theorems, Lebesgue spaces, Fubini's theorem, and applications to Fourier transforms and probability. **PREREQS:** MTH 412 or MTH 512

MTH 524. DYNAMICAL SYSTEMS THEORY AND APPLICATIONS (3). Theory, models, and problems for discrete and/or continuous dynamical systems. Depending on term, the emphasis may be toward deterministic or stochastic systems. Topics generally include stability theory, periodic behavior, and chaotic systems. Models selected from biology, economics, fluid dynamics, and electrical and mechanical systems. May be repeated once for credit with a different topic. This course is repeatable for a maximum of 6 credits. **PREREQS:** MTH 341-MTH 342, MTH 311-MTH 312, MTH 361 or consent of instructor.

MTH 525. DYNAMICAL SYSTEMS THEORY AND APPLICATIONS (3). Theory, models, and problems for discrete and/or continuous dynamical systems. Depending on term, the emphasis may be toward deterministic or stochastic systems. Topics generally include stability theory, periodic behavior, and chaotic systems. Models selected from biology, economics, fluid dynamics, and electrical and mechanical systems. May be repeated once for credit with a different topic. This course is repeatable for a maximum of 6 credits. **PREREQS:** MTH 341 and MTH 342 and MTH 311 and MTH 312 and MTH 361 or consent of instructor.

MTH 531. GENERAL TOPOLOGY AND FUNDAMENTAL GROUPS (3). Topological spaces and maps. Separation axioms, compactness, convergence, extension theorems, metrizability and compactification. Product spaces and simplicial complexes. Definition and basic properties of the fundamental group functor, with applications to the theory of covering spaces. Selected topics from dimension theory, manifold theory, and other areas of topology. **PREREQS:** MTH 531 and MTH 532 must be taken in order.

MTH 532. GENERAL TOPOLOGY AND FUNDAMENTAL GROUPS (3). Topological spaces and maps. Separation axioms, compactness, convergence, extension theorems, metrizability and compactification. Product spaces and simplicial complexes. Definition and basic properties of the fundamental group functor, with applications to the theory of covering spaces. Selected topics from dimension theory, manifold theory, and other areas of topology. **PREREQS:** MTH 531 and MTH 532 must be taken in order.

MTH 534. INTRODUCTION TO DIFFERENTIAL GEOMETRY (3). Curves and surfaces in Euclidean space; geodesics; curvature; introduction to tensor algebra and differential forms; selected applications. **PREREQS:** MTH 312 and MTH 342 or instructor approval required.

MTH 535. DIFFERENTIAL GEOMETRY (3). Differentiable 2-manifolds; curvature; geodesics; tensor algebra and the algebra of exterior differential forms with emphasis on Euclidean space; differentiation of tensors and forms; integration of forms; selected applications. **PREREQS:** (MTH 434 or MTH 534) or instructor approval required.

MTH 536. DIFFERENTIAL GEOMETRY (3). Differentiable 2-manifolds; curvature; geodesics; tensor algebra and the algebra of exterior differential forms with emphasis on Euclidean space; differentiation of tensors and forms;

integration of forms; selected applications. **PREREQS:** (MTH 434 or MTH 534) or instructor approval required.

MTH 537. GENERAL RELATIVITY (3). Geometry of special relativity. Tensor analysis, metrics, geodesics, curvature. Einstein field equations, cosmological models, black holes. Selected topics such as global structure, conserved quantities, spinors. **PREREQS:** MTH 311. (MTH 434 or MTH 534) is recommended.

MTH 540. COMPUTATIONAL NUMBER THEORY (3). Development of the number theory used in some basic tests of primality and methods of factoring integers. Applications to cryptography. **PREREQS:** MTH 231 or MTH 343 or MTH 355

MTH 541. APPLIED AND COMPUTATIONAL ALGEBRA (3). Applications of fundamental algebraic systems to topics such as factorization of polynomials, finding roots of polynomials, error correcting codes. **PREREQS:** MTH 342 or (MTH 440 or MTH 540) or instructor approval required.

MTH 542. APPLIED AND COMPUTATIONAL ALGEBRA (3). Applications of fundamental algebraic systems to topics such as factorization of polynomials, finding roots of polynomials, error correcting codes. **PREREQS:** (MTH 441 or MTH 541) or instructor approval required.

MTH 543. ABSTRACT LINEAR ALGEBRA (3). Abstract vector spaces. Linear transformations, eigenvalues and eigenvectors, the Jordan canonical form, inner product spaces. **PREREQS:** MTH 342 and MTH 343

MTH 551. NUMERICAL LINEAR ALGEBRA (3). Computation of solutions of linear systems using direct and iterative methods; least-squares solution of overdetermined systems; computation of eigenvalues and eigenvectors. **PREREQS:** MTH 341 and programming experience or instructor approval required. MTH 342 and MTH 351 are recommended.

MTH 552. NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS (3). Numerical solution of initial-value problems using Runge-Kutta methods and linear multistep methods; introduction to boundary-value problems. Analysis of stability, accuracy, and implementation of methods. **PREREQS:** MTH 256 and (MTH 451 or MTH 551) or instructor approval required.

MTH 553. NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS (3). Numerical solution of boundary value problems and initial-boundary value problems using finite difference and finite element methods. Analysis of stability, accuracy, and implementation of methods. **PREREQS:** (MTH 452 or MTH 552) or instructor approval required.

MTH 563. PROBABILITY I (3). An introduction to probability theory; topics covered include: the axioms of probability, probability spaces and models, independence, random variables; densities, distributions, expectation, and variance; probability inequalities, the law of large numbers, and the binomial central limit theorem. **PREREQS:** MTH 312 or instructor approval required.

MTH 564. PROBABILITY II (3). Transformations of random variables; sums of independent random variables, generating functions, characteristic functions, the central limit theorem and other weak limit theorems. **PREREQS:** (MTH 463 or MTH 563) and MTH 341 or instructor approval required.

MTH 565. PROBABILITY III (3). Random variables, central limit theorem; distributions of standard statistics; Markov chains, continuous and discontinuous stochastic processes. **PREREQS:** (MTH 464 or MTH 564) or instructor approval required.

MTH 567. ACTUARIAL MATHEMATICS (3). Foundations of actuarial science from the point of view of mathematical models that arise in the design and management of insurance systems. Most models will be life insurance based. **PREREQS:** (MTH 463 or MTH 563) or ST 421.

MTH 570. DISCRETE TOPICS IN K-8 MATH (3). Key ideas and topics in discrete mathematics critical for the mathematics content knowledge of elementary teachers in grades K-8. Based on the recommendations of The Mathematical Education of Teachers by the Conference Board of the Mathematical Sciences. **PREREQS:** MTH 390 or instructor approval required.

MTH 574. NUMBER SYSTEMS AND OPERATIONS IN K-8 MATHEMATICS (3). Key ideas and topics in number systems, operations, place value, and algorithms critical for the mathematics content knowledge of elementary teachers in grades K-8. Based on the recommendations of The Mathematical Education of Teachers by the Conference Board of the Mathematical Sciences. **PREREQS:** MTH 390 or instructor approval required.

MTH 575. COMPARING GEOMETRIES IN K-8 MATHEMATICS (3). Key ideas and topics in Euclidean and non-Euclidean geometries critical for the mathematics content knowledge of elementary teachers in grades K-8. Based on the recommendations of The Mathematical Education of Teachers by the Conference Board of the Mathematical Sciences. **PREREQS:** MTH 390 or instructor approval required.

MTH 576. ALGEBRA AND FUNCTION IN K-8 MATHEMATICS (3). Key ideas and topics in algebra and function concepts critical for the mathematics content knowledge of elementary teachers in grades K-8. Based on the recommendations of The Mathematical Education of Teachers by the Conference Board of the Mathematical Sciences. **PREREQS:** MTH 390 or instructor approval required.

MTH 577. MEASUREMENT AND CHANGE IN K-8 MATHEMATICS (3). Key ideas and topics in measurement, units, rates of change, and accumulation of change critical for the mathematics content knowledge of elementary teachers in grades K-8. Based on the recommendations of The Mathematical Education of Teachers by the Conference Board of the Mathematical Sciences. **PREREQS:** MTH 390 or instructor approval required.

MTH 578. PROBABILITY AND DATA ANALYSIS IN K-8 MATHEMATICS (3). Key ideas and topics in probability, data analysis, and statistics critical for the mathematics content knowledge of elementary teachers in grades K-8. Based on the recommendations of The Mathematical Education of Teachers by the Conference Board of the Mathematical Sciences. **PREREQS:** MTH 390 or instructor approval required.

MTH 581. MATHEMATICAL METHODS FOR ENGINEERS AND SCIENTISTS (3). Linear and nonlinear systems of ordinary differential equations, elementary stability theory, higher order equations, boundary value problems, series solution of ordinary differential equations. **PREREQS:** MTH 256

MTH 582. MATHEMATICAL METHODS FOR ENGINEERS AND SCIENTISTS (3). Partial differential equations, Bessel's and Legendre's equations, Fourier analysis, separation of variables, transform methods. **PREREQS:** MTH 481 or consent of instructor.

MTH 583. MATHEMATICAL METHODS FOR ENGINEERS AND SCIENTISTS (3). Introduction to the complex differential and integral calculus: Cauchy's theorem and formula, the residue calculus, power series and Laurent series, harmonic functions, conformal mapping, and applications. **PREREQS:** MTH 256

MTH 590. DISCRETE TOPICS IN SECONDARY MATHEMATICS (3). Key ideas and topics in discrete mathematics critical for the mathematics content knowledge of middle and high school teachers in grades 6-12. Based on the recommendations of The Mathematical Education of Teachers by the Conference Board of the Mathematical Sciences. **PREREQS:** MTH 390 or instructor approval required.

MTH 591. ALGEBRA AND GEOMETRIC TRANSFORMATIONS (3). Ordered fields, number systems (natural, integer, rational, real, and complex), fundamental theorems of arithmetic and algebra, algebraic and transcendental numbers, constructible points and numbers and the classical geometric constructions, Pólya's problem solving heuristics and strategies. Intended primarily for prospective mathematics teachers. **PREREQS:** MTH 341

MTH 592. ALGEBRA AND GEOMETRIC TRANSFORMATIONS (3). Major results of Euclidean geometry, axiom systems for Euclidean geometry, dependency tree of Euclidean theorems, groups of geometric transformations with applications to symmetries of plane and solid objects, Euler's formula, tilings and tessellations, isometries and similitudes of the plane (translations, rotations, reflections, glide reflections, dilations). Intended primarily for prospective mathematics teachers. **PREREQS:** MTH 491 or MTH 591

MTH 593. ALGEBRA AND GEOMETRIC TRANSFORMATIONS (3). Geometric transformations as real, complex, and matrix functions, invariants and genealogy of geometric transformations, extensions to transformations of the sphere and of three-dimensional space, selected applications chosen from fractals, analysis of frieze and crystallographic patterns, problem solving, groups of symmetries, computer graphics, and the use of dynamic geometry software. Intended primarily for prospective mathematics teachers. **PREREQS:** MTH 492 or MTH 592

MTH 594. NUMBER SYSTEMS AND OPERATIONS IN SECONDARY MATHEMATICS (3). Key ideas and topics in number systems, operations, place value, and algorithms critical for the mathematics content knowledge of middle and high school teachers in grades 6-12. Based on the recommendations of The Mathematical Education of Teachers by the Conference Board of the Mathematical Sciences. **PREREQS:** MTH 390 or instructor approval required.

MTH 595. COMPARING GEOMETRIES IN SECONDARY MATHEMATICS (3). Key ideas and topics in Euclidean and non-Euclidean geometries critical for the mathematics content knowledge of middle and high school teachers in grades 6-12. Based on the recommendations of The Mathematical Education of Teachers by the Conference Board of the Mathematical Sciences. **PREREQS:** MTH 390 or instructor approval required.

MTH 596. ALGEBRA AND FUNCTION IN SECONDARY MATHEMATICS (3). Key ideas and topics in algebra and function concepts critical for the mathematics content knowledge of middle and high school teachers in grades 6-12. Based on the recommendations of The Mathematical Education of Teachers by the Conference Board of the Mathematical Sciences. **PREREQS:** MTH 390 or instructor approval required.

MTH 597. MEASUREMENT AND CHANGE IN SECONDARY MATHEMATICS (3). Key ideas and topics in measurement, units, rates of change, and accumulation of change critical for the mathematics content knowledge of middle and high school teachers in grades 6-12. Based on the recommendations of The Mathematical Education of Teachers by the Conference Board of the Mathematical Sciences. **PREREQS:** MTH 390 or instructor approval required.

MTH 598. PROBABILITY AND DATA ANALYSIS IN SECONDARY MATHEMATICS (3). Key ideas and topics in probability, data analysis, and statistics critical for the mathematics content knowledge of middle and high school teachers in grades 6-12. Based on the recommendations of The Mathematical Education of Teachers by the Conference Board of the Mathematical Sciences. **PREREQS:** MTH 390 or instructor approval required.

MTH 599. SPECIAL TOPICS (1-16). Topics may vary. This course is repeatable for a maximum of 18 credits. **PREREQS:** Instructor approval required.

MTH 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MTH 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

MTH 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MTH 606. SPECIAL PROJECTS (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MTH 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MTH 611. COMPLEX ANALYSIS (3). Basic theory of analytic functions of a complex variable, including Cauchy's theorem, residue theorem, analytic continuation, conformal mappings, entire, and meromorphic functions. **PREREQS:** (MTH 411 or MTH 511). MTH 611 and MTH 612 must be taken in order.

MTH 612. COMPLEX ANALYSIS (3). Basic theory of analytic functions of a complex variable, including Cauchy's theorem, residue theorem, analytic continuation, conformal mappings, entire, and meromorphic functions. **PREREQS:** MTH 611

MTH 614. FUNCTIONAL ANALYSIS (3). Topological vector spaces, generalized functions, operator theory. Normally offered alternate years. **PREREQS:** MTH 513

MTH 619. TOPICS IN ANALYSIS (1-12). This course is repeatable for a maximum of 12 credits.

MTH 621. DIFFERENTIAL AND INTEGRAL EQUATIONS OF MATHEMATICAL PHYSICS (3). Partial differential equations of physics, including those of potential theory, wave propagation, and heat flow, treated by classical means, generalized functions and variational principles. Square summable function methods and integral equations. This course is repeatable for a maximum of 6 credits. **PREREQS:** 6 credits of senior-level analysis or instructor consent. MTH 621, MTH 622, MTH 623 must be taken in order.

MTH 622. DIFFERENTIAL AND INTEGRAL EQUATIONS OF MATHEMATICAL PHYSICS (3). Partial differential equations of physics, including those of potential theory, wave propagation, and heat flow, treated by classical means, generalized functions and variational principles. Square summable function methods and integral equations. This course is repeatable for a maximum of 6 credits. **PREREQS:** MTH 621 and 6 credits of senior-level analysis or instructor consent.

MTH 623. DIFFERENTIAL AND INTEGRAL EQUATIONS OF MATHEMATICAL PHYSICS (3). Partial differential equations of physics, including those of potential theory, wave propagation, and heat flow, treated by classical means, generalized functions and variational principles. Square summable function methods and integral equations. This course is repeatable for a maximum of 6 credits. **PREREQS:** MTH 622 and 6 credits of senior-level analysis or instructor consent.

MTH 627. PARTIAL DIFFERENTIAL EQUATIONS (3). Advanced theory including existence proofs and distributional approach. Normally offered alternate years. **PREREQS:** MTH 413 or MTH 513 or instructor consent.

MTH 628. PARTIAL DIFFERENTIAL EQUATIONS (3). Advanced theory including existence proofs and distributional approach. Normally offered alternate years. **PREREQS:** MTH 627 or consent of instructor.

MTH 634. ALGEBRAIC TOPOLOGY (3).

Simplicial and singular homology, products, and cohomology; applications to fixed-point and separation theorems. Topics selected from homotopy, manifold and obstruction theory. Normally offered alternate years. **PREREQS:** MTH 532. MTH 634, MTH 635, MTH 636 must be taken in order.

MTH 635. ALGEBRAIC TOPOLOGY (3).

Simplicial and singular homology, products, and cohomology; applications to fixed-point and separation theorems. Topics selected from homotopy, manifold and obstruction theory. Normally offered alternate years. **PREREQS:** MTH 532 and MTH 634

MTH 636. ALGEBRAIC TOPOLOGY (3).

Simplicial and singular homology, products, and cohomology; applications to fixed-point and separation theorems. Topics selected from homotopy, manifold and obstruction theory. Normally offered alternate years. **PREREQS:** MTH 532 and MTH 635

MTH 644. ABSTRACT ALGEBRA (3). Group theory, rings and fields, Galois theory. **PREREQS:** Graduate standing in mathematics or a related field, or instructor approval required. MTH 443 or MTH 543 is recommended.

MTH 645. ABSTRACT ALGEBRA (3). Group theory, rings and fields, Galois theory. **PREREQS:** Graduate standing in mathematics or a related field, or instructor approval required. MTH 644 is recommended.

MTH 649. TOPICS IN ALGEBRA AND NUMBER THEORY (3). This course is repeatable for a maximum of 27 credits.

MTH 654. NUMERICAL ANALYSIS (3). Advanced topics in numerical analysis, such as finite volume methods and finite element methods for partial differential equations, numerical methods for inverse problems, and image processing. **PREREQS:** (MTH 451 or MTH 551) and (MTH 452 or MTH 552) and (MTH 453 or MTH 553) or equivalent or instructor's consent.

MTH 655. NUMERICAL ANALYSIS (3). Advanced topics in numerical analysis, such as finite volume methods and finite element methods for partial differential equations, numerical methods for inverse problems, and image processing. **PREREQS:** MTH 654 or instructor's consent.

MTH 656. NUMERICAL ANALYSIS (3). Advanced topics in numerical analysis, such as finite volume methods and finite element methods for partial differential equations, numerical methods for inverse problems, and image processing. **PREREQS:** MTH 655 or instructor's consent.

MTH 657. TOPICS IN APPLIED MATHEMATICS (1-12). Previous topics have included turbulence, financial mathematics and probability methods in partial differential equations. This course is repeatable for a maximum of 12 credits.

MTH 658. TOPICS IN MATHEMATICAL MODELING (1-12). Mathematical treatment of topics of current interest in the physical and biological sciences and technology. May be repeated for credit when topic varies. This course is repeatable for a maximum of 12 credits. **PREREQS:** Instructor approval required.

MTH 659. TOPICS IN NUMERICAL ANALYSIS (1-12). This course is repeatable for a maximum of 12 credits.

MTH 664. PROBABILITY THEORY (3). General theory of probability measures and random variables, including weak convergence, characteristic functions, central limit theory, conditional expectations, martingales. **PREREQS:** MTH 411 or MTH 511 or equivalent.

MTH 665. PROBABILITY THEORY (3). General theory of probability measures and random variables, including weak convergence, characteristic functions, the central limit theorem, and the Brownian motion process. **PREREQS:** MTH 664

MTH 669. TOPICS IN STOCHASTIC PROCESSES (1-12). Previous topics have included Markov processes, martingales, branching processes, and stochastic differential equations. This course is repeatable for a maximum of 12 credits.

MTH 674. DIFFERENTIAL GEOMETRY OF MANIFOLDS (3). Differentiable manifolds, tangent bundles, vector fields and flows, submanifolds, Riemannian metrics, differential forms, integration on manifolds. Selected topics such as foliations, Lie groups, and de Rham cohomology. **PREREQS:** MTH 341 and (MTH 411 or MTH 511). MTH 674 or MTH 675 must be taken in order.

MTH 675. DIFFERENTIAL GEOMETRY OF MANIFOLDS (3). Differentiable manifolds, connections in linear bundles, Riemannian manifolds and submanifolds. Selected topics such as variational theory of geodesics, harmonic forms, and characteristic classes. Normally offered alternate years. **PREREQS:** MTH 674

MTH 676. TOPICS IN TOPOLOGY (3). This course is repeatable for a maximum of 27 credits.

MTH 679. TOPICS IN GEOMETRY (1-12). This course is repeatable for a maximum of 12 credits.

MTH 680. MODERN APPROACHES TO CALCULUS (3). Alternative approaches to calculus instruction based on the availability of computers and calculators. Applications of symbolic-graphical calculators, spreadsheets, symbolic algebra systems, and graphics packages to the teaching of calculus. **PREREQS:** MTH 253 and instructor approval required.

MTH 681. MODERN APPROACHES TO EUCLIDEAN GEOMETRY (3). Various aspects of Euclidean geometry, based on research and curriculum efforts of the last 20 years. Familiarity with Euclidean geometry at the level of MTH 337 will be presumed. Topics include partitioning the plane and space, tessellations and tilings, polyhedra, visualization and drawing, polygons and numbers, coordinates, transformations, conic sections, curves and surfaces, and computer graphics. **PREREQS:** Instructor approval required.

MTH 682. TEACHING AND LEARNING PROBABILITY AND STATISTICS (3). Experimental, activity-based approaches to introductory probability and statistics are explored. Topics include computer simulations, exploratory data analysis, misuses of statistics, and misconceptions of probability. **PREREQS:** Instructor approval required.

MTH 683. GRAPHICS CALCULATORS IN PRECALCULUS MATHEMATICS (3). Uses of hand-held graphics technology in algebra, trigonometry, and precalculus. Recommendations from the National Council of Teachers of Mathematics on the use of graphing calculators in the secondary curriculum. **PREREQS:** Instructor approval required.

MTH 684. COMPUTERS AND MATHEMATICS (3). A variety of mathematical problems are investigated with a laboratory approach using microcomputers and a wide variety of software. Problems may be taken from number theory, calculus, geometry, probability, and elementary numerical analysis. **PREREQS:** Ability to program in either BASIC or PASCAL and instructor approval required.

MTH 685. ADVANCED PROBLEM SOLVING (3). Mathematical problem solving using the heuristic approach of George Polya. Problems may be taken from a variety of areas, including number theory, calculus, geometry, probability, abstract and linear algebra. **PREREQS:** Instructor approval required.

MTH 689. TOPICS IN MATHEMATICS EDUCATION (1-12). Topics may vary. This course is repeatable for a maximum of 12 credits.

MTH 699. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PHYSICS

Henri Jansen, Chair

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FACULTY

Professors Jansen, Lee, Manogue, McIntyre, Tate

Associate Professors Giebultowicz, Hetherington, Minot, Ostroverkhova

Assistant Professors Demaree, Roundy, Schneider, Sun, Zwolak

Instructor Bannon, Coffin, Ketter
Adjunct Faculty
Keszler

Undergraduate Major

Physics (BA, BS, CRED, HBA, HBS)

Options

Applied Physics

Biophysics

Chemical Physics

Computational Physics

Geophysics

Mathematical Physics

Optical Physics

Physics Education

Minor

Physics

Graduate Majors

Applied Physics (MS, PSM)

Physics (MA, MAIS, MS, PhD)

Graduate Areas of Concentration

Atomic Physics

Computational Physics

Nuclear Physics

Optical Physics

Particle Physics

Physics Education

Solid State Physics

Relativity

Graduate Minor

Physics

Physics is the study of the fundamental structure of matter and the interactions of its constituents. Physicists are concerned with the development of concepts needed for a precise description of nature and with experiments to test such concepts.

For students of science and engineering, the study of physics provides the basic foundation needed to understand the complex workings of the material world, from the forces that build atoms to those

that build bridges. For students of the liberal arts, the study of physics provides an introduction to modern ideas about the most fundamental and elemental aspects of nature and how those ideas developed in their cultural and historical context. Physics is a basic and indispensable tool in all technical fields, and its development figures prominently in any discussion of the intellectual history of our civilization.

UNDERGRADUATE DEGREE PROGRAMS

The department offers several programs leading to degrees in physics. A basic physics curriculum in the College of Science stresses the detailed and advanced preparation needed for graduate work or employment in physics.

Options are available within the physics degree program that prepare students for graduate work or employment in an allied field, such as applied physics, biophysics, chemical physics, geophysics, mathematical physics, optical physics, and physics education.

Other programs are offered that train students for careers in physics teaching. A Physics minor is available for students majoring in other areas of science and engineering.

The Department of Physics offers the upper-division curriculum, Paradigms in Physics. Many of the junior-year courses are taught in 2-credit intensive modules, meeting seven hours a week for about three weeks.

GRADUATE DEGREES

Graduate programs leading to the MA, MS, and PhD are offered, emphasizing theoretical or experimental studies in the areas of atomic physics, computational physics, nuclear physics, optical physics, particle physics, and solid state physics. The MS degree has both thesis and nonthesis options. Comprehensive written and oral examinations must be passed before the student can become a candidate for an advanced degree.

CAREERS

A multitude of opportunities exists for students who complete undergraduate degrees in physics. They include employment in technological industries, including electronics, computers, optics, materials science, and aerospace; graduate study leading to an advanced degree in physics or a related area such as mathematics, Earth sciences, computer science, engineering, or astronomy; and degree programs leading to professions such as law or medicine, with specialties in areas in which a physics background is essential.

PREPARATION

Recommended high school preparation for students who plan to major in physics includes one year each of chemistry and physics and four years of mathematics through analytic geometry. Mathematics preparation is especially important; students who are not ready to start calculus (MTH 251, *Differential Calculus) upon entering may be delayed in their progress toward a degree. Students anticipating transfer to OSU from another institution are encouraged to contact the Department of Physics as early as possible to discuss their placement in the course curricula.

ADVISING

Each undergraduate student is assigned an advisor who helps select the most appropriate degree program and assists in planning the curriculum. Minor variations in the requirements for degrees are possible, but must be discussed with the advisor and approved at an early stage in curriculum planning. Near the end of the degree program, the advisor can help the student to apply for employment or admission to graduate programs.

OPTIONS

Students desiring to combine the study of physics with that of another related subject should consider the options below, or should consult with a Department of Physics advisor about substituting upper-division work in a related field for certain of the upper-division physics requirements. All such substitutions must constitute a coherent program in related areas and must be approved in advance by the Department of Physics. In each case, the program must include at least 3 credits of PH 403, ^Thesis, to satisfy the university's writing intensive course (WIC) requirements.

ASTRONOMY

The Department of Physics offers an introductory course, PH 104, *Descriptive Astronomy. Students who desire careers in astronomy can design a curriculum under the Geophysics option, which includes related course work in geology and in atmospheric sciences. This curriculum would qualify the student for graduate work in astronomy.

GRADUATION REQUIREMENTS

All undergraduate students must satisfy the university requirements for graduation (see the description of the **OSU Baccalaureate Core** in this catalog) and the college requirements (see the descriptions in the **College of Science** or **College of Engineering** section). **All physics majors must complete the following lower-division courses:**

CH 231, CH 232, CH 233. *General Chemistry (4,4,4)

and CH 261, CH 262, CH 263.

*Laboratory for Chemistry 231, 232, 233 (1,1,1)

MTH 251. *Differential Calculus (4)

MTH 252. Integral Calculus (4)

MTH 253. Infinite Series and Sequences (4)

MTH 254. Vector Calculus I (4)

MTH 255. Vector Calculus II (4)

MTH 256. Applied Differential Equations (4)
PH 211, PH 212, PH 213. *General Physics with Calculus (4,4,4)

PH 221, PH 222, PH 223. Recitations for PH 211, PH 212, PH 213 (1,1,1)

PH 265 or another approved course in computer programming.

Seniors must complete at least 3 credits of PH 403 to satisfy the WIC requirement.

For graduation under the basic physics option, upper-division course requirements include:

MTH 341. Linear Algebra I (3)

PH 314. Introductory Modern Physics (4)

PH 320. Paradigms in Physics: Symmetries (2)

PH 411. Analog and Digital Electronics (3)

PH 412. Analog and Digital Electronics (3)

PH 421. Paradigms in Physics: Oscillations (2)

PH 422. Paradigms in Physics: Static Vector Fields (2)

PH 423. Paradigms in Physics: Energy and Entropy (2)

PH 424. Paradigms in Physics: Waves in One Dimension (2)

PH 425. Paradigms in Physics: Quantum Measurements and Spin (2)

PH 426. Paradigms in Physics: Central Forces (2)

PH 427. Paradigms in Physics: Periodic Systems (2)

PH 428. Paradigms in Physics: Rigid Bodies (2)

or PH 429. Paradigms in Physics: Reference Frames (2)

PH 431. Capstones in Physics: Electromagnetism (3)

PH 435. Capstones in Physics: Classical Mechanics (3)

PH 441. Capstones in Physics: Thermal and Statistical Physics (3)

PH 451. Capstones in Physics: Quantum Mechanics (3)

PH 461. Capstones in Physics: Mathematical Methods (3)

PH 481. Physical Optics (4)

PH 415. Computer Interfacing and Instrumentation (3)

or PH 464. Scientific Computing II (3)

At least one additional course must be chosen from the following:

PH 415. Computer Interfacing and Instrumentation (3)

PH 464. Scientific Computing II (3)

PH 465. Computational Physics (3)

PH 475. Introduction to Solid State Physics (3)

PH 482. Optical Electronic Systems (4)

PH 483. Guided Wave Optics (4)

PH 485. Atomic, Molecular, and Optical Physics (3)

PH 495. Introduction to Particle and Nuclear Physics (3)

To qualify for the Bachelor of Arts degree in Physics, students must complete:

- PH 314. Introductory Modern Physics (4)
 PH 320. Paradigms in Physics: Symmetries (2)
 PH 421. Paradigms in Physics: Oscillations (2)
 PH 422. Paradigms in Physics: Static Vector Fields (2)
 PH 423. Paradigms in Physics: Energy and Entropy (2)
 PH 424. Paradigms in Physics: Waves in One Dimension (2)
 PH 425. Paradigms in Physics: Quantum Measurements and Spin (2)
 PH 426. Paradigms in Physics: Central Forces (2)
 PH 427. Paradigms in Physics: Periodic Systems (2)
 PH 428. Paradigms in Physics: Rigid Bodies (2)
OR PH 429. Paradigms in Physics: Reference Frames (2)

And at least one of:

- PH 431. Capstones in Physics: Electromagnetism (3)
 PH 435. Capstones in Physics: Classical Mechanics (3)
 PH 441. Capstones in Physics: Thermal and Statistical Physics (3)
 PH 451. Capstones in Physics: Quantum Mechanics (3)
 PH 461. Capstones in Physics: Mathematical Methods (3)

And at least 7 additional credits chosen from among the non-blanket 400-level courses listed for the BS degree in Physics.

In addition, the student must complete 9 credits of approved electives in the College of Liberal Arts and must complete or demonstrate proficiency in the second year of a foreign language.

Grades of C– or better must be attained in all courses required for the Physics major. Courses in which a lower grade is received must be repeated until a satisfactory grade is received.

PHYSICS (BA, BS, CRED, HBA, HBS)**Sample Curriculum in Physics****Freshman Year**

- CH 231, CH 232, CH 233. *General Chemistry (4,4,4)
and CH 261, CH 262, CH 263.
 *Laboratory for Chemistry 231, 232, 233 (1,1,1)
 MTH 251. *Differential Calculus (4)
 MTH 252. Integral Calculus (4)
 MTH 254. Vector Calculus I (4)
 PH 211. *General Physics with Calculus (4)
 PH 221. Recitation for Physics 211 (1)
 PH 265. Scientific Computing (3)
 Fitness (3)
 Perspectives (3)
 Writing I (3)

Sophomore Year

- MTH 253. Infinite Series and Sequences (4)
 MTH 255. Vector Calculus (4)
 MTH 256. Applied Differential Equations (4)
 PH 212, PH 213. *General Physics with

- Calculus (4,4)
 PH 222, PH 223. Recitation for Physics 212, 213 (1,1)
 PH 314. Introductory Modern Physics (4)
 Biological science (4)
 Perspectives (9)
 Writing II, III (6)

Junior Year

- MTH 341. Linear Algebra (3)
 PH 320. Paradigms in Physics: Symmetries (2)
 PH 411, PH 412. Analog and Digital Electronics (3,3)
 PH 415. Computer Interfacing and Instrumentation (3)
 PH 421, PH 422, PH 423, PH 424, PH 425, PH 426, PH 427, PH 428 **or** PH 429. Paradigms in Physics (18)
 PH 435. Capstones in Physics: Classical Mechanics (3)
 Perspectives (3)
 Synthesis (3)
 Electives (6)

Senior Year

- PH 401. Research (1)
 PH 403. ^Thesis (3)
 PH 431. Capstones in Physics: Electromagnetism (3)
 PH 441. Capstones in Physics: Thermal and Statistical Physics (3)
 PH 451. Capstones in Physics: Quantum Physics (3)
 PH 461. Capstones in Physics: Mathematical Methods (3)
 PH 464. Scientific Computing II (3)
 PH 481. Physical Optics (4)
 Physics elective (3)
 Synthesis (3)
 Electives (19)

OPTIONS**APPLIED PHYSICS OPTION**

- PH 314. Introduction to Modern Physics (4)
 PH 320. Paradigms in Physics: Symmetries (2)
 PH 411, PH 412. Analog and Digital Electronics (3,3)
 PH 415. Computer Interfacing and Instrumentation (3)
 PH 421. Paradigms in Physics: Oscillations (2)
 PH 422. Paradigms in Physics: Static Vector Fields (2)
 PH 423. Paradigms in Physics: Energy and Entropy (2)
 PH 424. Paradigms in Physics: Waves in One Dimension (2)
 PH 425. Paradigms in Physics: Quantum Measurements and Spin (2)
 PH 426. Paradigms in Physics: Central Forces (2)
 PH 427. Paradigms in Physics: Periodic Systems (2)
 PH 431. Capstones in Physics: Electromagnetism (3)
 PH 435. Capstones in Physics: Classical Mechanics (3)
or PH 451. Capstones in Physics: Quantum Mechanics (3)
 PH 461. Capstones in Physics: Mathematical Methods (3)
 PH 481. Physical Optics (4)

Plus: 15 credits of upper-division work in an engineering discipline that may include:

- PH 482. Optical Electronic Systems (4)
 and PH 483. Guided Wave Optics (4)

It also may include one of:

- PH 475. Introduction to Solid State Physics (3)
 PH 495. Introduction to Particle and Nuclear Physics (3)

(The engineering courses must be approved in advance by a Department of Physics advisor.)

Engineering science (ENGR) courses cannot be used to satisfy this option.

BIOPHYSICS OPTION**Required Courses**

- BB 450. General Biochemistry (4)
 BB 451. General Biochemistry (3)
 BB 481. Biophysics (3)
 CH 331, CH 332. Organic Chemistry (4,4)
 PH 314. Introductory Modern Physics (4)
 PH 320. Paradigms in Physics: Symmetries (2)
 PH 411, PH 412. Analog and Digital Electronics (3,3)
 PH 415. Computer Interfacing and Instrumentation (3)
 PH 421. Paradigms in Physics: Oscillations (2)
 PH 422. Paradigms in Physics: Static Vector Fields (2)
 PH 423. Paradigms in Physics: Energy and Entropy (2)
 PH 424. Paradigms in Physics: Waves in One Dimension (2)
 PH 425. Paradigms in Physics: Quantum Measurements and Spin (2)
 PH 426. Paradigms in Physics: Central Forces (2)
 PH 427. Paradigms in Physics: Periodic Systems (2)
 PH 428. Paradigms in Physics: Rigid Bodies (2)
 PH 431. Capstones in Physics: Electromagnetism (3)
 PH 435. Capstones in Physics: Classical Mechanics (3)
or PH 451. Capstones in Physics: Quantum Mechanics (3)
 PH 461. Capstones in Physics: Mathematical Methods (3)
 PH 481. Physical Optics (4)

CHEMICAL PHYSICS OPTION

- PH 314. Introduction to Modern Physics (4)
 PH 320. Paradigms in Physics: Symmetries (2)
 PH 411, PH 412. Analog and Digital Electronics (3,3)
 PH 415. Computer Interfacing and Instrumentation (3)
 PH 421. Paradigms in Physics: Oscillations (2)
 PH 422. Paradigms in Physics: Static Vector Fields (2)
 PH 423. Paradigms in Physics: Energy and Entropy (2)
 PH 424. Paradigms in Physics: Waves in One Dimension (2)
 PH 425. Paradigms in Physics: Quantum Measurements and Spin (2)

- PH 426. Paradigms in Physics: Central Forces (2)
 PH 427. Paradigms in Physics: Periodic Systems (2)
 PH 431. Capstones in Physics: Electromagnetism (3)
 PH 435. Capstones in Physics: Classical Mechanics (3)
 PH 441. Capstones in Physics: Thermal and Statistical Physics (3)
or CH 440. Physical Chemistry (3)
 PH 451. Capstones in Physics: Quantum Mechanics (3)
 PH 461. Capstones in Physics: Mathematical Methods (3)

Plus: 12 credits of approved upper-division work in chemistry, including at least one lab course.

COMPUTATIONAL PHYSICS OPTION

- PH 314. Introduction to Modern Physics (4)
 PH 320. Paradigms in Physics: Symmetries (2)
 PH 411, PH 412. Analog and Digital Electronics (3,3)
 PH 415. Computer Interfacing and Instrumentation (3)
 PH 421. Paradigms in Physics: Oscillations (2)
 PH 422. Paradigms in Physics: Static Vector Fields (2)
 PH 423. Paradigms in Physics: Energy and Entropy (2)
 PH 424. Paradigms in Physics: Waves in One Dimension (2)
 PH 425. Paradigms in Physics: Quantum Measurements and Spin (2)
 PH 426. Paradigms in Physics: Central Forces (2)
 PH 431. Capstones in Physics: Electromagnetism (3)
 PH 461. Capstones in Physics: Mathematical Methods (3)
 PH 464. Scientific Computing II (3)
 PH 465. Computational Physics (3)
 PH 481. Physical Optics (4)

Plus: 15 credits of upper-division work constituting a coherent program in computational science.

GEOPHYSICS OPTION

- PH 314. Introduction to Modern Physics (4)
 PH 320. Paradigms in Physics: Symmetries (2)
 PH 411, PH 412. Analog and Digital Electronics (3,3)
 PH 415. Computer Interfacing and Instrumentation (3)
 PH 421. Paradigms in Physics: Oscillations (2)
 PH 422. Paradigms in Physics: Static Vector Fields (2)
 PH 423. Paradigms in Physics: Energy and Entropy (2)
 PH 424. Paradigms in Physics: Waves in One Dimension (2)
 PH 425. Paradigms in Physics: Quantum Measurements and Spin (2)
 PH 426. Paradigms in Physics: Central Forces (2)
 PH 431. Capstones in Physics: Electromagnetism (3)
 PH 435. Capstones in Physics: Classical Mechanics (3)

- PH 441. Capstones in Physics: Thermal and Statistical Physics (3)
 PH 461. Capstones in Physics: Mathematical Methods (3)
 PH 481. Physical Optics (4)
Plus 15 credits selected from below:
 ATS 411. Thermodynamics and Cloud Microphysics (4)
 ATS 412. Atmospheric Radiation (3)
 ATS 475. Planetary Atmospheres (3)
 GEO 463. ^Geophysics and Tectonics (4)
 GEO 487. Hydrogeology (4)
 OC 430. Principles of Physical Oceanography (4)

MATHEMATICAL PHYSICS OPTION

- PH 314. Introduction to Modern Physics (4)
 PH 320. Paradigms in Physics: Symmetries (2)
 PH 411, PH 412. Analog and Digital Electronics (3,3)
 PH 415. Computer Interfacing and Instrumentation (3)
 PH 421. Paradigms in Physics: Oscillations (2)
 PH 422. Paradigms in Physics: Static Vector Fields (2)
 PH 423. Paradigms in Physics: Energy and Entropy (2)
 PH 424. Paradigms in Physics: Waves in One Dimension (2)
 PH 425. Paradigms in Physics: Quantum Measurements and Spin (2)
 PH 426. Paradigms in Physics: Central Forces (2)
 PH 428. Paradigms in Physics: Rigid Bodies (2)
or PH 429. Paradigms in Physics: Reference Frames (2)
 PH 431. Capstones in Physics: Electromagnetism (3)
 PH 435. Capstones in Physics: Classical Mechanics (3)
 PH 441. Capstones in Physics: Thermal and Statistical Physics (3)
 PH 451. Capstones in Physics: Quantum Mechanics (3)
 PH 461. Capstones in Physics: Mathematical Methods (3)
 PH 464. Scientific Computing II (3)

Plus: 12 credits of approved upper-division work in mathematics.

OPTICAL PHYSICS OPTION

- PH 314. Introduction to Modern Physics (4)
 PH 320. Paradigms in Physics: Symmetries (2)
 PH 411, PH 412. Analog and Digital Electronics (3,3)
 PH 415. Computer Interfacing and Instrumentation (3)
 PH 421. Paradigms in Physics: Oscillations (2)
 PH 422. Paradigms in Physics: Static Vector Fields (2)
 PH 423. Paradigms in Physics: Energy and Entropy (2)
 PH 424. Paradigms in Physics: Waves in One Dimension (2)
 PH 425. Paradigms in Physics: Quantum Measurements and Spin (2)
 PH 426. Paradigms in Physics: Central Forces (2)

- PH 427. Paradigms in Physics: Periodic Systems (2)
 PH 428. Paradigms in Physics: Rigid Bodies (2)
or PH 429. Paradigms in Physics: Reference Frames (2)
 PH 431. Capstones in Physics: Electromagnetism (3)
 PH 435. Capstones in Physics: Classical Mechanics (3)
 PH 441. Capstones in Physics: Thermal and Statistical Physics (3)
 PH 451. Capstones in Physics: Quantum Mechanics (3)
 PH 461. Capstones in Physics: Mathematical Methods (3)
 PH 481. Physical Optics (4)
 PH 482. Optical Electronic Systems (4)
 PH 483. Guided Wave Optics (4)

PHYSICS EDUCATION OPTION

Physics Core (49)

- PH 211, PH 212, PH 213. *General Physics with Calculus (4,4,4)
 PH 221, PH 222, PH 223. Recitation for Physics 211, 212, 213 (1,1,1)
 PH 314. Introductory Modern Physics (4)
 PH 320. Paradigms in Physics: Symmetries (2)
 PH 403. ^Thesis (3)
 PH 421. Paradigms in Physics: Oscillations (2)
 PH 422. Paradigms in Physics: Static Vector Fields (2)
 PH 424. Paradigms in Physics: Waves in One Dimension (2)
 PH 425. Paradigms in Physics: Quantum Measurements and Spin (2)
 PH 426. Paradigms in Physics: Central Forces (2)
 PH 431. Capstones in Physics: Electromagnetism (3)
 PH 435. Capstones in Physics: Classical Mechanics (3)
 PH 451. Capstones in Physics: Quantum Mechanics (3)
 400-level physics electives (6)
 Writing Intensive Course (3)

Option requirements (21)

- PH 265. Scientific Computing (3)
 PH 407. Seminar (Teaching) (3)
 SED 409. Field Practicum: Science and Mathematics–Elem, MS (3)
 SED 409. Field Practicum: Science and Mathematics–MS, HS (3)
 SED 412. Technology Foundations for Teaching Math and Science (3)
 SED 413. Inquiry in Science and Science Education (3)

Chemistry (15)

- CH 231, CH 232, CH 233. *General Chemistry (4,4,4)
and CH 261, CH 262, CH 263.
 *Laboratory for Chemistry 231, 232, 233 (1,1,1)

Math (24)

- MTH 251. *Differential Calculus (4)
 MTH 252. Integral Calculus (4)
 MTH 254. Vector Calculus I (4)
 MTH 255. Vector Calculus II (4)
 MTH 256. Applied Differential Equations (4)
 MTH 306. Matrix and Power Series Methods (4)

Baccalaureate Core (37)**Electives (34)****Total=180**

The selected option courses meet the requirements for an option (21 credits, 18 upper division) and are made up of courses not specifically required in the Physics major.

PHYSICS MINOR**Requirements**

PH 211, PH 212, PH 213. *General Physics With Calculus (4,4,4)

PH 314. Introductory Modern Physics (4)

Plus at least 12 credits of upper-division courses selected, after consultation with an advisor, from the following list, and including at least one theory course:

PH 320. Paradigms in Physics: Symmetries (2)

PH 421. Paradigms in Physics: Oscillations (2)

PH 422. Paradigms in Physics: Static Vector Fields (2)

PH 423. Paradigms in Physics: Energy and Entropy (2)

PH 424. Paradigms in Physics: Waves in One Dimension (2)

PH 425. Paradigms in Physics: Quantum Measurements and Spin (2)

PH 426. Paradigms in Physics: Central Forces (2)

PH 427. Paradigms in Physics: Periodic Systems (2)

PH 428. Paradigms in Physics: Rigid Bodies (2)

PH 429. Paradigms in Physics: Reference Frames (2)

PH 431. Capstones in Physics: Electromagnetism (3)

PH 435. Capstones in Physics: Classical Mechanics (3)

PH 441. Capstones in Physics: Thermal and Statistical Physics (3)

PH 451. Capstones in Physics: Quantum Mechanics (3)

PH 461. Capstones in Physics: Mathematical Methods (3)

PH 481. Physical Optics (4)

PH 482. Optical Electronic Systems (4)

PH 483. Guided Wave Optics (4)

And at least one experimental course:

PH 411. Analog and Digital Electronics (3)

PH 412. Analog and Digital Electronics (3)

PH 415. Computer Interfacing and Instrumentation (3)

PH 465. Computational Physics (3)

PH 466. Computational Physics (3)

PH 481. Physical Optics (4)

PH 482. Optical Electronic Systems (4)

PH 483. Guided Wave Optics (4)

GRADUATE MAJORS**APPLIED PHYSICS (MS, PSM)**

Janet Tate, Director
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Email: tate@physics.oregonstate.edu
Website: <http://psm.science.oregonstate.edu/>

The worlds of science and business are increasingly interconnected, creating strong demand for individuals who can bridge these two disciplines. The Professional Science Master's (PSM) in Applied Physics at OSU is the first program of its kind in the Pacific Northwest and was created with the help of professional affiliates who are leaders in industries dependent on applications of physics either to produce or to exploit contemporary technologies. In Oregon, industries such as semiconductor manufacturing, optical and electronic instrumentation, and software have become the dominant employers, replacing lumbering, fishing and other traditional resource-based industries. Applied physicists study photovoltaic technology, optoelectronics, energy and communication systems, imaging of cells and nanostructures, and many other subjects. An internship providing job experience in a technology-rich environment as well as special training in business management, communications, and ethics to complement core science uniquely qualify PSM Physics graduates for these diverse careers.

The PSM program can usually be completed in two years, based on full-time study and at least 54 credit hours. The technical curriculum is based on a core of graduate courses in the fundamental subjects of physics. Core physics courses (four courses selected from: PH 531, PH 535, PH 541, PH 551, PH 621, PH 631, PH 641, and PH 651) will cover topics such as electromagnetism, statistical and thermal physics and quantum mechanics. Elective courses develop skills in modeling, statistical analysis, and data management or in scientific fields closely related to physics (e.g. materials, energy etc.). Professional courses are required in communication, research ethics, and business management (PSM 513, PSM 565, PSM 566, PSM 567, COMM 550 and PHL 547). These courses are designed to be taken in sequence during the first academic year. Students are required to complete a 3 to 6 month internship (6-12 credits) in lieu of thesis research (PH 510).

For general information about PSM programs, contact the PSM Director, 2082 Cordley Hall, Corvallis OR 97331, 541-737-5259; email: kirstin.carroll@oregonstate.edu.

Degree Requirements (54 credits)

Core physics courses (12)

Electives (18)

Professional courses (18)

Internship (6)

PHYSICS (MA, MS, PhD, MAIS)**Graduate Areas of Concentration**

Atomic physics, computational physics, nuclear physics, optical physics, particle physics, physics education, relativity, solid state physics

The Department of Physics offers courses and research experience leading to the Master of Arts, Master of Science, and Doctor of Philosophy degrees. Advanced-degree candidates may pursue thesis research in experimental, computational, or theoretical AMO (atomic, molecular, and optical) physics, nuclear and particle physics, or solid state physics. Special programs are available for students who are preparing for careers in undergraduate teaching. Thesis and nonthesis programs are offered leading to the MS and MA degrees. A written comprehensive examination must be passed prior to the nonthesis master's final oral or the PhD preliminary oral examination. There are no foreign language requirements.

The department maintains a vigorous colloquium program in which well-known physicists present lectures on current research. Students are invited to participate in topical seminars offered regularly in each of the major research areas for the discussion of research results and for studies of specialized subjects at an advanced level.

Fellowships and assistantships are offered to qualified graduate students. A descriptive brochure is available from the Department of Physics.

PHYSICS GRADUATE MINOR

For more details, see the departmental advisor.

COURSES**PH 104. *DESCRIPTIVE ASTRONOMY (4).**

Historical and cultural context of discoveries concerning planets and stars and their motions. Topics include the solar system, the constellations, birth and death of stars, pulsars and black holes. An accompanying laboratory is used for demonstrations, experiments, and projects, as well as for outdoor observations. Lec/lab. (Bacc Core Course)

PH 104H. *DESCRIPTIVE ASTRONOMY (4).

Historical and cultural context of discoveries concerning planets and stars and their motions. Topics include the solar system, the constellations, birth and death of stars, pulsars and black holes. An accompanying laboratory is used for demonstrations, experiments, and projects, as well as for outdoor observations. Lec/lab. (Bacc Core Course) **PREREQS:** Honors College approval required.

PH 106. *PERSPECTIVES IN PHYSICS (4).

A descriptive and non-mathematical study of the development of physical concepts and their historical and philosophical context. The emphasis is on the origin, meaning, significance, and limitations of these concepts and their role in the

evolution of current understanding of the universe. Concepts to be covered include Copernican astronomy, Newtonian mechanics, energy, electricity and magnetism, relativity, and quantum theory. Intended primarily for non-science students. Lec/lab. (Bacc Core Course)

PH 111. *INQUIRING INTO PHYSICAL PHENOMENA (4). Development of conceptual understandings through investigation of everyday phenomena. Emphasis is on questioning, predicting, exploring, observing, discussing, and writing in physical science contexts. Students document their initial thinking, record their evolving understandings, and write reflections upon how their thinking changed and what fostered their learning. Lec/lab. (Baccalaureate Core Course)

PH 199. SPECIAL STUDIES (1-16). One-credit sections are graded pass/no pass. This course is repeatable for a maximum of 99 credits. **PREREQS:** Departmental approval required.

PH 201. *GENERAL PHYSICS (5). Introductory survey course covering a broad spectrum of classical and modern physics with applications. Topics include dynamics, vibrations and waves, electricity and magnetism, optics, and modern physics. Laboratory and recitation sections accompany the lectures. Mathematical preparation should include college algebra and trigonometry. Lec/lab/rec. (Bacc Core Course) **PREREQS:** MTH 111 and MTH 112. PH 201, PH 202, PH 203 must be taken in order.

PH 201H. *GENERAL PHYSICS (5). Introductory survey course covering a broad spectrum of classical and modern applications with physics. Topics include dynamics, vibrations and waves, electricity and magnetism, optics, and modern physics. Laboratory and recitation sections accompany the lectures. Mathematical preparation should include college algebra and trigonometry. Lec/lab/rec. (Bacc Core Course) **PREREQS:** MTH 111 and MTH 112. PH 201, PH 202, PH 203 must be taken in order. Honors College approval required.

PH 202. *GENERAL PHYSICS (5). Introductory survey course covering broad spectrum of classical and modern physics with applications. Topics include dynamics, vibrations and waves, electricity and magnetism, optics, and modern physics. Laboratory and recitation sections accompany the lectures. Mathematical preparation should include college algebra and trigonometry. Lec/lab/rec. (Bacc Core Course) **PREREQS:** MTH 111 and MTH 112 and PH 201

PH 202H. *GENERAL PHYSICS (5). Introductory survey course covering broad spectrum of classical and modern physics with applications. Topics include dynamics, vibrations and waves, electricity and magnetism, optics, and modern physics. Laboratory and recitation sections accompany the lectures. Mathematical preparation should include college algebra and trigonometry. (Bacc Core Course) **PREREQS:** MTH 111 and MTH 112 and PH 201. Honors College approval required.

PH 203. *GENERAL PHYSICS (5). Introductory survey course covering broad spectrum of classical and modern physics with applications. Topics include dynamics, vibrations and waves, electricity and magnetism, optics, and modern physics. Laboratory and recitation sections accompany the lectures. Mathematical preparation should include college algebra and trigonometry. Lec/lab/rec. (Bacc Core Course) **PREREQS:** MTH 111 and MTH 112 and PH 202

PH 203H. *GENERAL PHYSICS (5). Introductory survey course covering a broad spectrum of classical and modern physics with applications. Topics include dynamics, vibrations and waves, electricity and magnetism, optics, and modern physics. Laboratory and recitation sections accompany the lectures. Mathematical preparation should include college algebra and trigonometry. (Bacc Core Course) **PREREQS:** MTH 111 and

MTH 112 and PH 202. Honors College approval required.

PH 205. *SOLAR SYSTEM ASTRONOMY (4). History, laws, and tools of astronomy. Composition, motion, and origin of the sun, planets, moons, asteroids, and comets. An accompanying laboratory is used for demonstrations, experiments, and projects, as well as for outdoor observations. The courses in the astronomy sequence (PH 205, PH 206, PH 207) can be taken in any order. Lec/lab. (Bacc Core Course)

PH 206. *STARS AND STELLAR EVOLUTION (4). Properties of stars; star formation, evolution, and death; supernovae, pulsars, and black holes. An accompanying laboratory is used for demonstrations, experiments, and projects, as well as for outdoor observations. The courses in the astronomy sequence (PH 205, PH 206, PH 207) can be taken in any order. Lec/lab. (Bacc Core Course)

PH 207. *GALAXIES, QUASARS, AND COSMOLOGY (4). Nature and content of galaxies, properties of quasars, and the cosmic background radiation. Emphasis on the Big-Bang model and its features. An accompanying laboratory is used for demonstrations, experiments, and projects, as well as for outdoor observations. The courses in the astronomy sequence (PH 205, PH 206, PH 207) can be taken in any order. Lec/lab. (Bacc Core Course)

PH 211. *GENERAL PHYSICS WITH CALCULUS (4). A comprehensive introductory survey course intended primarily for students in the sciences and engineering. Topics include mechanics, wave motion, thermal physics, electromagnetism, and optics. Elementary calculus is used. Laboratory work accompanies the lectures. Lec/lab/rec. (Bacc Core Course) **PREREQS:** MTH 251. **COREQ:** MTH 252. Concurrent enrollment in a recitation section is strongly recommended.

PH 211H. *GENERAL PHYSICS WITH CALCULUS (4). A comprehensive introductory survey course intended primarily for students in the sciences and engineering. Topics include mechanics, wave motion, thermal physics, electromagnetism, and optics. Elementary calculus is used. Laboratory work accompanies the lectures. Lec/lab/rec. (Bacc Core Course) **PREREQS:** MTH 251. **COREQ:** MTH 252. Concurrent enrollment in a recitation section is strongly recommended. Honors College approval required.

PH 212. *GENERAL PHYSICS WITH CALCULUS (4). A comprehensive introductory survey course intended primarily for students in the sciences and engineering. Topics include mechanics, wave motion, thermal physics, electromagnetism, and optics. Elementary calculus is used. Laboratory work accompanies the lectures. Lec/lab/rec. (Bacc Core Course) **PREREQS:** MTH 252 and PH 211. **COREQ:** MTH 254. Concurrent enrollment in a recitation section is strongly recommended.

PH 212H. *GENERAL PHYSICS WITH CALCULUS (4). A comprehensive introductory survey course intended primarily for students in the sciences and engineering. Topics include mechanics, wave motion, thermal physics, electromagnetism, and optics. Elementary calculus is used. Laboratory work accompanies the lectures. Lec/lab/rec. (Bacc Core Course) **PREREQS:** MTH 252 and PH 211. **COREQ:** MTH 254. Concurrent enrollment in a recitation section is strongly recommended. Honors college approval required.

PH 213. *GENERAL PHYSICS WITH CALCULUS (4). A comprehensive introductory survey course intended primarily for students in the sciences and engineering. Topics include mechanics, wave motion, thermal physics, electromagnetism, and optics. Elementary calculus is used. Laboratory work accompanies the lectures. Lec/lab/rec. (Bacc Core Course) **PREREQS:** MTH 254 and PH 212.

Concurrent enrollment in a recitation section is strongly recommended.

PH 213H. *GENERAL PHYSICS WITH CALCULUS (4). A comprehensive introductory survey course intended primarily for students in the sciences and engineering. Topics include mechanics, wave motion, thermal physics, electromagnetism, and optics. Elementary calculus is used. Laboratory work accompanies the lectures. Lec/lab/rec. (Bacc Core Course) **PREREQS:** MTH 254 and PH 212. Concurrent enrollment in a recitation section is strongly recommended. Honors College approval required.

PH 221. RECITATION FOR PHYSICS 211 (1). One-hour weekly session for the development of problem-solving skills in calculus-based general physics. Lec/rec. Graded P/N. **COREQS:** PH 211

PH 221H. RECITATION FOR PHYSICS 211 (1). One-hour weekly session for the development of problem-solving skills in calculus-based general physics. Lec/rec. **PREREQS:** Honors College approval required. Students must take coreq PH 211 or PH 211H.

PH 222. RECITATION FOR PHYSICS 212 (1). One-hour weekly session for the development of problem-solving skills in calculus-based general physics. Graded P/N. **COREQS:** PH 212

PH 222H. RECITATION FOR PHYSICS 212 (1). One-hour weekly session for the development of problem-solving skills in calculus-based general physics. Lec/rec. **PREREQS:** Honors College approval required. Students must take coreq PH 212 or PH 212H.

PH 223. RECITATION FOR PHYSICS 213 (1). One-hour weekly session for the development of problem-solving skills in calculus-based general physics. Lec/rec. Graded P/N. **COREQS:** PH 213

PH 223H. RECITATION FOR PHYSICS 213 (1). One-hour weekly session for the development of problem-solving skills in calculus-based general physics. Lec/rec. **PREREQS:** Honors College approval required. Students must take coreq PH 213 or PH 213H.

PH 265. SCIENTIFIC COMPUTING (3). Basic computational tools and techniques for courses in science and engineering. Project approach to problem solving using symbolic and compiled languages with visualization. Basic computer literacy assumed. **PREREQS:** Concurrent enrollment in MTH 251.

PH 313. *ENERGY ALTERNATIVES (3). Exploration of the challenges and opportunities posed by dwindling resources; physical and technological basis of our current energy alternatives; new or controversial technologies such as nuclear or solar power; overview of resource availability, patterns of energy consumption, and current governmental policies. (Bacc Core Course) **PREREQS:** Upper-division standing and 12 credits of introductory science.

PH 314. INTRODUCTORY MODERN PHYSICS (4). An elementary introduction to relativity and quantum theory, emphasizing the experiments that revealed the limitations of classical physics. Applications include the properties of atoms, nuclei, and solids. Laboratory work accompanies lectures. Lec/lab. **PREREQS:** PH 213. **COREQ:** MTH 256.

PH 320. PARADIGMS IN PHYSICS: SYMMETRIES (2). Symmetry and idealization in problem-solving. Gauss's and Ampere's laws in orthonormal coordinates, power series as approximations, complex numbers. **PREREQS:** PH 213. **COREQ:** MTH 255

PH 331. *SOUND, HEARING, AND MUSIC (3). Basic course in the physics, technology, and societal implications of sound. Intended for students in nontechnical majors. Topics include wave motion, hearing and the perception of sound, noise pollution, music and musical instruments, architectural acoustics, and sound recording and reproduction. (Bacc Core Course) **PREREQS:**

Upper-division standing and one year of university science, or instructor approval required.

PH 332. *LIGHT, VISION, AND COLOR (3). Basic physics of light, optical instruments (lenses, telescopes, microscopes), the eye and visual perception, colors, photography, environmental lighting, lasers and holography. For nontechnical majors. (Bacc Core Course) **PREREQS:** Upper-division standing and one year of university science or instructor approval required.

PH 365. APPLICATIONS IN COMPUTATIONAL PHYSICS I (1). A project-driven laboratory experience in computational physics. Includes the use of basic mathematical and numerical techniques in computer calculations leading to solutions for typical physical problems. Topics to be covered include classical mechanics and electromagnetism. **PREREQS:** PH 213 and Students should take PH 265 prior to PH 365, or talk with the instructor about whether they have adequate preparation.

PH 366. APPLICATIONS IN COMPUTATIONAL PHYSICS II (1). A project-driven laboratory experience in computational physics. Includes the use of basic mathematical and numerical techniques in computer calculations leading to solutions for typical physical problems. Topics to be covered focus on quantum mechanics. **PREREQS:** PH 213 and Students should take PH 265 prior to PH 366, or talk with the instructor about whether they have adequate preparation.

PH 367. APPLICATIONS IN COMPUTATIONAL PHYSICS III (1). A project-driven laboratory experience in computational physics. Includes the use of basic mathematical and numerical techniques in computer calculations leading to solutions for typical physical problems. Topics to be covered include statistical mechanics and many-body systems. **PREREQS:** PH 213 and Students should take PH 265 prior to PH 367, or talk with the instructor about whether they have adequate preparation.

PH 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

PH 399H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

PH 401. RESEARCH (1-16). A research project under the supervision of a faculty member, whose approval must be arranged by the student in advance of registration. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PH 403. ^THESIS (1-16). A research project leading to a thesis under the supervision of a faculty member, whose approval must be arranged by the student in advance of registration. (Writing Intensive Course) This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PH 405. READING AND CONFERENCE (1-16). An independent study project under the supervision of a faculty member, whose approval must be arranged by the student in advance of registration. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PH 407. SEMINAR (1-16). Departmental seminars or colloquium. Graded P/N. This course is repeatable for a maximum of 16 credits.

PH 407H. SEMINAR (1-16). Departmental seminars or colloquium. This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

PH 410. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PH 411. ANALOG AND DIGITAL ELECTRONICS (3). Circuit theory. Passive dc and ac circuits including filters, resonance, complex impedance

and Fourier analysis. Operational amplifiers, gates and combinational logic. Semiconductor principles, diodes, transistors, BJTs and FETs. Multiplexing, flip-flops and sequential logic, 555 timer, registers and memory, DAC, ADC. **PREREQS:** PH 314*. PH 411 and PH 412 must be taken in order.

PH 412. ANALOG AND DIGITAL ELECTRONICS (3). Circuit theory. Passive dc and ac circuits including filters, resonance, complex impedance and Fourier analysis. Operational amplifiers, gates and combinational logic. Semiconductor principles, diodes, transistors, BJTs and FETs. Multiplexing, flip-flops and sequential logic, 555 timer, registers and memory, DAC, ADC. **PREREQS:** PH 314* and PH 411

PH 415. COMPUTER INTERFACING AND INSTRUMENTATION (3). Applications of computers as scientific instruments, with emphasis on hardware and instrumentation, online data acquisition, and computer control of experiments. **PREREQS:** Upper-division or graduate standing; PH 412/PH 512 or equivalent background in electronics; and instructor approval required. Departmental approval required.

PH 421. PARADIGMS IN PHYSICS: OSCILLATIONS (2). Dynamics of mechanical and electrical oscillations using Fourier series and integrals, time and frequency representations for driven damped oscillators, resonance, coupled oscillators, and vector spaces. **PREREQS:** PH 213

PH 422. PARADIGMS IN PHYSICS: STATIC VECTOR FIELDS (2). Theory of static electric and magnetic fields, including sources, superposition, using the techniques of vector calculus, including Stokes and divergence theorems, and computer visualizations. **PREREQS:** PH 213 and MTH 255*

PH 423. PARADIGMS IN PHYSICS: ENERGY AND ENTROPY (2). Basic thermodynamic methods of simple polymers, magnetic systems and stars. **PREREQS:** PH 212 and (PH 424 or PH 524) or (PH 425 or PH 525)

PH 424. PARADIGMS IN PHYSICS: WAVES IN ONE DIMENSION (2). One-dimensional waves in classical and quantum mechanics, barriers and wells, reflection and transmission, resonance and normal modes, wave packets with and without dispersion. **PREREQS:** PH 314 and (PH 421 or PH 521)

PH 425. PARADIGMS IN PHYSICS: QUANTUM MEASUREMENTS AND SPIN (2). Introduction to quantum mechanics through Stern-Gerlach spin measurements. Probability, eigenvalues, operators, measurement, state reduction, Dirac notation, matrix mechanics, time evolution, spin precession, Rabi oscillations. **PREREQS:** PH 314 and MTH 341*

PH 426. PARADIGMS IN PHYSICS: CENTRAL FORCES (2). Central forces: gravitational and electrostatic, angular momentum and spherical harmonics, separation of variables in classical and quantum mechanics, hydrogen atom. **PREREQS:** PH 314 and (PH 422 or PH 522) and (PH 424 or PH 524)

PH 427. PARADIGMS IN PHYSICS: PERIODIC SYSTEMS (2). Quantum waves in one-dimensional periodic systems; Bloch waves, band structure, phonons and electrons in solids, reciprocal lattice, x-ray diffraction. **PREREQS:** PH 424 or PH 524

PH 428. PARADIGMS IN PHYSICS: RIGID BODIES (2). Rigid body dynamics, invariance, angular momentum, rotational motion, tensors and eigenvalues. **PREREQS:** PH 426 or PH 526

PH 429. PARADIGMS IN PHYSICS: REFERENCE FRAMES (2). Inertial and non-inertial frames of reference, rotations, Galilean and Lorentz transformation, collisions, equivalence principle, special relativity, symmetries and conservation laws, invariants, and electromagnetism. **PREREQS:** PH 314

PH 431. CAPSTONES IN PHYSICS: ELECTROMAGNETISM (3). Static electric and magnetic fields in matter, electrostatics, Maxwell equations, electromagnetic waves, wave guides, dipole radiation. **PREREQS:** (PH 424 or 524) and (PH 426 or PH 526)

PH 435. CAPSTONES IN PHYSICS: CLASSICAL MECHANICS (3). Newtonian, Lagrangian and Hamiltonian formulations of classical mechanics: single-particle motion, collisions, variational methods, and normal coordinate description of coupled oscillators. **PREREQS:** (PH 424 or PH 524) and (PH 426 or PH 526)

PH 441. CAPSTONES IN PHYSICS: THERMAL AND STATISTICAL PHYSICS (3). Entropy and quantum mechanics; canonical Gibbs probability; ideal gas; thermal radiation; Einstein and Debye lattices; grand canonical Gibbs probability; ideal Fermi and Bose gases; chemical reactions and phase transformations. **PREREQS:** (PH 423 or PH 523) and (PH 451 or PH 551)

PH 451. CAPSTONES IN PHYSICS: QUANTUM MECHANICS (3). Wave mechanics, Schrodinger equation, operators, harmonic oscillator, identical particles, atomic fine structure, approximation methods and applications. **PREREQS:** (PH 424 or PH 524) and (PH 425 or PH 525) and (PH 426 or PH 526)

PH 461. CAPSTONES IN PHYSICS: MATHEMATICAL METHODS (3). Complex algebra, special functions, partial differential equations, series solutions, complex integration, calculus of residues. **PREREQS:** (PH 424 or PH 524) and (PH 426 or PH 526) and MTH 256

PH 464. SCIENTIFIC COMPUTING II (3). Mathematical, numerical, and conceptual elements forming foundations of scientific computing: computer hardware, algorithms, precision, efficiency, verification, numerical analysis, algorithm scaling, profiling, and tuning. Lec/lab.

PH 465. COMPUTATIONAL PHYSICS (3). The use of basic mathematical and numerical techniques in computer calculations leading to solutions for typical physical problems. Topics to be covered include models and applications ranging from classical mechanics and electromagnetism to modern solid state and particle physics. **PREREQS:** PH 464 or PH 564

PH 466. COMPUTATIONAL PHYSICS (3). The use of basic mathematical and numerical techniques in computer calculations leading to solutions for typical physical problems. Topics to be covered include models and applications ranging from classical mechanics and electromagnetism to modern solid state and particle physics. **PREREQS:** Mathematical physics such as PH 461, PH 462/PH 562 or MTH 481/MTH 581, MTH 482/MTH 582, MTH 483/MTH 583, plus knowledge of a compiled language such as Pascal, C, or Fortran. A physics background including PH 431/PH 531, PH 435/PH 535, and PH 451/PH 551 is assumed.

PH 481. PHYSICAL OPTICS (4). Wave propagation, polarization, interference, diffraction, and selected topics in modern optics. **PREREQS:** (PH 431 or PH 531) or equivalent.

PH 482. OPTICAL ELECTRONIC SYSTEMS (4). Photodetectors, laser theory, and laser systems. Lec/lab. **CROSSLISTED** as ECE 482/ECE 582. **PREREQS:** ECE 391 or (PH 481 or PH 581) or equivalent.

PH 483. GUIDED WAVE OPTICS (4). Optical fibers, fiber mode structure and polarization effects, fiber interferometry, fiber sensors, optical communication systems. Lec/lab. **CROSSLISTED** as ECE 483/ECE 583. **PREREQS:** (ECE 391* or PH 481*)

PH 495. INTRODUCTION TO PARTICLE AND NUCLEAR PHYSICS (3). Elementary particles and forces, nuclear structure and reactions. **PREREQS:** (PH 429 or PH 529) and (PH 441 or PH 541) and (PH 451 or PH 551)

PH 501. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PH 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

PH 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PH 507. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

PH 510. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits.

PH 511. ANALOG AND DIGITAL ELECTRONICS (3). Circuit theory. Passive dc and ac circuits including filters, resonance, complex impedance and Fourier analysis. Operational amplifiers, gates and combinational logic. Semiconductor principles, diodes, transistors, BJTs and FETs. Multiplexing, flip-flops and sequential logic, 555 timer, registers and memory, DAC, ADC. PH 511 and PH 512 must be taken in order. **PREREQS:** PH 314*

PH 512. ANALOG AND DIGITAL ELECTRONICS (3). Circuit theory. Passive dc and ac circuits including filters, resonance, complex impedance and Fourier analysis. Operational amplifiers, gates and combinational logic. Semiconductor principles, diodes, transistors, BJTs and FETs. Multiplexing, flip-flops and sequential logic, 555 timer, registers and memory, DAC, ADC. **PREREQS:** PH 314* and PH 511

PH 515. COMPUTER INTERFACING AND INSTRUMENTATION (3). Applications of computers as scientific instruments, with emphasis on hardware and instrumentation, online data acquisition, and computer control of experiments. **PREREQS:** Upper-division or graduate standing; (PH 412 or PH 512) or equivalent background in electronics; and instructor approval required. Departmental approval required.

PH 521. PARADIGMS IN PHYSICS: OSCILLATIONS (2). Dynamics of mechanical and electrical oscillations using Fourier series and integrals, time and frequency representations for driven damped oscillators, resonance, coupled oscillators, and vector spaces. **PREREQS:** PH 213

PH 522. PARADIGMS IN PHYSICS: STATIC VECTOR FIELDS (2). Theory of static electric and magnetic fields, including sources, superposition, using the techniques of vector calculus, including Stokes and divergence theorems, and computer visualizations. **PREREQS:** PH 213 and MTH 255*

PH 523. PARADIGMS IN PHYSICS: ENERGY AND ENTROPY (2). Basic thermodynamic methods of simple polymers, magnetic systems and stars. **PREREQS:** PH 212 and (PH 424 or PH 524) or (PH 425 or PH 525)

PH 524. PARADIGMS IN PHYSICS: WAVES IN ONE-DIMENSION (2). One-dimensional waves in classical and quantum mechanics, barriers and wells, reflection and transmission, resonance and normal modes, wave packets with and without dispersion. **PREREQS:** PH 314 and (PH 421 or PH 521)

PH 525. PARADIGMS IN PHYSICS: QUANTUM MEASUREMENTS AND SPIN (2). Introduction to quantum mechanics through Stern-Gerlach spin measurements. Probability, eigenvalues, operators, measurement, state reduction, Dirac notation, matrix mechanics, time evolution, spin precession, Rabi oscillations. **PREREQS:** PH 314 and MTH 341*

PH 526. PARADIGMS IN PHYSICS: CENTRAL FORCES (2). Central forces: gravitational and electrostatic, angular momentum and spherical harmonics, separation of variables in classical and quantum mechanics, hydrogen atom. **PREREQS:** PH 314 and (PH 422 or PH 522) and (PH 424 or PH 524)

PH 527. PARADIGMS IN PHYSICS: PERIODIC SYSTEMS (2). Quantum waves in one-dimensional periodic systems; Bloch waves, band structure, phonons and electrons in solids, reciprocal lattice, x-ray diffraction. **PREREQS:** PH 424 or PH 524

PH 528. PARADIGMS IN PHYSICS: RIGID BODIES (2). Rigid body dynamics, invariance, angular momentum, rotational motion, tensors and eigenvalues. **PREREQS:** PH 426 or PH 526

PH 529. PARADIGMS IN PHYSICS: REFERENCE FRAMES (2). Inertial and non-inertial frames of reference, rotations, Galilean and Lorentz transformation, collisions, equivalence principle, special relativity, symmetries and conservation laws, invariants, and electromagnetism. **PREREQS:** PH 314

PH 531. CAPSTONES IN PHYSICS: ELECTROMAGNETISM (3). Static electric and magnetic fields in matter, electrodynamics, Maxwell equations, electromagnetic waves, wave guides, dipole radiation. **PREREQS:** (PH 424 or PH 524) and (PH 426 or PH 526)

PH 535. CAPSTONES IN PHYSICS: CLASSICAL MECHANICS (3). Newtonian, Lagrangian and Hamiltonian formulations of classical mechanics: single-particle motion, collisions, variational methods, and normal coordinate description of coupled oscillators. **PREREQS:** (PH 424 or PH 524) and (PH 426 or PH 526)

PH 541. CAPSTONES IN PHYSICS: THERMAL AND STATISTICAL PHYSICS (3). Entropy and quantum mechanics; canonical Gibbs probability; ideal gas; thermal radiation; Einstein and Debye lattices; grand canonical Gibbs probability; ideal Fermi and Bose gases; chemical reactions and phase transformations. **PREREQS:** (PH 423 or PH 523) and (PH 451 or PH 551)

PH 551. CAPSTONES IN PHYSICS: QUANTUM MECHANICS (3). Wave mechanics, Schrodinger equation, operators, harmonic oscillator, identical particles, atomic fine structure, approximation methods and applications. **PREREQS:** (PH 424 or PH 524) and (PH 425 or PH 525) and (PH 426 or PH 526)

PH 561. MATHEMATICAL PHYSICS (3). Fundamental mathematical techniques needed for graduate students in physics. Topics include vector spaces and operators; fourier series, integrals, and transforms; partial differential equations; special functions, distributions, and delta functions; Green's functions; complex analysis.

PH 562. MATHEMATICAL PHYSICS (3). Fundamental mathematical techniques needed for graduate students in physics. Topics include vector spaces and operators; fourier series, integrals, and transforms; partial differential equations; special functions, distributions, and delta functions; Green's functions; complex analysis.

PH 564. SCIENTIFIC COMPUTING II (3). Mathematical, numerical, and conceptual elements forming foundations of scientific computing: computer hardware, algorithms, precision, efficiency, verification, numerical analysis, algorithm scaling, profiling, and tuning. Lec/lab.

PH 565. COMPUTATIONAL PHYSICS (3). The use of basic mathematical and numerical techniques in computer calculations leading to solutions for typical physical problems. Topics to be covered include models and applications ranging from classical mechanics and electromagnetism to modern solid state and particle physics. **PREREQS:** PH 464 or PH 564

PH 566. COMPUTATIONAL PHYSICS (3). The use of basic mathematical and numerical techniques in computer calculations leading to solutions for typical physical problems. Topics to be covered include models and applications ranging from classical mechanics and electromagnetism to modern solid state and particle physics. **PREREQS:** Mathematical physics

such as PH 461/PH 561, PH 462/PH 562 or MTH 481/MTH 581, MTH 482/MTH 582, MTH 483/MTH 583, plus knowledge of a compiled language such as Pascal, C, or FORTRAN. A physics background including PH 431/PH 531, PH 435/PH 535, and PH 451/PH 551 is assumed.

PH 575. INTRODUCTION TO SOLID STATE PHYSICS (3). Introduction to condensed matter physics for majors in physics, chemistry, and engineering. Topics include band structure, free electron behavior, optical properties, magnetism, and lattice excitations. **PREREQS:** (PH 451 or PH 551) or equivalent. COREQ: PH 427 or PH 527

PH 581. PHYSICAL OPTICS (4). Wave propagation, polarization, interference, diffraction, and selected topics in modern optics. **PREREQS:** (PH 431 or PH 531) or equivalent

PH 582. OPTICAL ELECTRONIC SYSTEMS (4). Photodetectors, laser theory, and laser systems. Lec/lab. CROSSLISTED as ECE 482/ECE 582. **PREREQS:** (PH 481 or PH 581) or equivalent

PH 583. GUIDED WAVE OPTICS (4). Optical fibers, fiber mode structure and polarization effects, fiber interferometry, fiber sensors, optical communication systems. Lec/lab. CROSSLISTED as ECE 483/ECE 583. **PREREQS:** (ECE 391* or PH 481* or PH 581*)

PH 585. ATOMIC, MOLECULAR, AND OPTICAL PHYSICS (3). Atomic and molecular structure, interaction with electromagnetic fields, atomic and molecular spectra, spectroscopic techniques, laser theory, nonlinear optics. **PREREQS:** (PH 431 or PH 531) or (PH 451 or PH 551)

PH 595. INTRODUCTION TO PARTICLE AND NUCLEAR PHYSICS (3). Elementary particles and forces, nuclear structure and reactions. **PREREQS:** (PH 429 or PH 529) and (PH 441 or PH 541) and (PH 451 or PH 551)

PH 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PH 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

PH 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

PH 607. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits.

PH 621. DYNAMICS OF SINGLE- AND MULTI-PARTICLE SYSTEMS (3). Introduction to theory of non-linear systems. Chaos in Hamiltonian and dissipative systems. Lyapunov exponents, fractal geometries. **PREREQS:** PH 435 or PH 535 or equivalent.

PH 631. ELECTROMAGNETIC THEORY (3). Electrostatics; multipole expansion; magnetostatics; radiation fields; dynamics of relativistic particles and electromagnetic fields. **PREREQS:** PH 431 or PH 531 or equivalent. PH 631, PH 632, PH 633 must be taken in order.

PH 632. ELECTROMAGNETIC THEORY (3). Electrostatics; multipole expansion; magnetostatics; radiation fields; dynamics of relativistic particles and electromagnetic fields. **PREREQS:** PH 631 and (PH 431 or PH 531 or equivalent)

PH 633. ELECTROMAGNETIC THEORY (3). Electrostatics; multipole expansion; magnetostatics; radiation fields; dynamics of relativistic particles and electromagnetic fields. **PREREQS:** PH 632 and (PH 431 or PH 531 or equivalent)

PH 641. STATISTICAL THERMOPHYSICS (3). Macroscopic thermodynamics and kinetic theory. Classical and quantum statistical ensembles; partition functions. Applications to atoms and molecules, clustering, solids, radiation. **PREREQS:** PH 435 or PH 535. PH 641, PH 642 must be taken in order.

PH 642. STATISTICAL THERMOPHYSICS (3). Macroscopic thermodynamics and kinetic theory. Classical and quantal statistical ensembles; partition functions. Applications to atoms and molecules, clustering, solids, radiation. **PREREQS:** (PH 435 or PH 535) and PH 641

PH 651. QUANTUM MECHANICS (3). Basic principles of nonrelativistic quantum theory and applications. Schrodinger theory, quantum theory of angular momentum, matrix mechanics, perturbation theory, identical particles, scattering. **PREREQS:** (PH 435 or PH 535) and (PH 451 or PH 551) or equivalents. PH 651, PH 652, PH 653 must be taken in order.

PH 652. QUANTUM MECHANICS (3). Basic principles of nonrelativistic quantum theory and applications. Schrodinger theory, quantum theory of angular momentum, matrix mechanics, perturbation theory, identical particles, scattering. **PREREQS:** (PH 435 or PH 535) and (PH 451 or PH 551) or equivalents and PH 651

PH 653. QUANTUM MECHANICS (3). Basic principles of nonrelativistic quantum theory and applications. Schrodinger theory, quantum theory of angular momentum, matrix mechanics, perturbation theory, identical particles, scattering. **PREREQS:** (PH 435 or PH 535) and (PH 451 or PH 551) or equivalents and PH 652

PH 654. ADVANCED QUANTUM THEORY (3). Scattering theory, second quantization and many body theory, relativistic quantum mechanics, quantization of fields, quantum electrodynamics, and elementary particles. **PREREQS:** PH 653. PH 654, PH 655, PH 656 must be taken in order.

PH 671. SOLID STATE PHYSICS, ELECTRON TRANSPORT (2). Fundamentals of solid state physics, Boltzmann transport, phonon and defect scattering, quantum transport, transport in magnetic field, localization, Mott-insulator transition, electron tunneling, superconductivity. Offered in alternate years. **PREREQS:** Basic knowledge of electromagnetism and quantum mechanics.

PH 672. SOLID STATE PHYSICS, THEORY (2). The many-body problem, density functional theory, excited states properties, BCS theory of superconductivity. Offered in alternate years. **PREREQS:** PH 575 and PH 654 and basic knowledge of electromagnetism and quantum mechanics.

PH 673. SOLID STATE PHYSICS, NANOSCIENCE AND NANOTECHNOLOGY (2). Introduction to nanoscience and nanotechnology; semiconductor quantum wells, wires, and dots; bulk metals vs nanoparticles; molecular ensembles vs single molecules; fabrication of nanoparticles and nanostructured materials; scanning probe microscopy; advanced optical imaging and manipulation. Offered in alternate years. **PREREQS:** Basic knowledge of electromagnetism and quantum mechanics.

PH 674. SOLID STATE PHYSICS, MAGNETISM (2). Magnetism of atoms; interaction between magnetic atoms, magnetic ordering in crystalline solids; excitations in magnetic solids; temperature dependent phenomena in magnetic solids; magnetism of metals, alloys, insulators and semiconductors; topics of considerable interest in contemporary research. **PREREQS:** Basic knowledge of electromagnetism and quantum mechanics.

PH 681. ATOMIC, MOLECULAR AND OPTICAL PHYSICS, MODERN OPTICS (2). Maxwell's equations in matter; refraction, phase and group indices; material and geometry dispersion; effective-medium regime. Not offered every year. **PREREQS:** Basic knowledge of electromagnetism and quantum mechanics.

PH 682. ATOMIC, MOLECULAR, OPTICAL PHYSICS, SEMICONDUCTOR OPTICS (2). Linear response theory; polarization effects; interband excitations and emissions; low dimensional systems; excitons; phonons;

semiconductor lasers; photovoltaics. Offered alternate years. **PREREQS:** Basic knowledge of electromagnetism and quantum mechanics.

PH 683. ATOMIC, MOLECULAR AND OPTICAL PHYSICS, NONLINEAR OPTICS (2). Coherent nonlinear electromagnetic phenomena; harmonic generation and parametric mixing; quantum mechanical description of multi-photon interactions; incoherent multi-photon interactions; coherent nonlinear optical phenomena and spectroscopies. Offered in alternate years. **PREREQS:** Basic knowledge of electromagnetism and quantum mechanics.

PH 684. ATOMIC, MOLECULAR AND OPTICAL PHYSICS, ULTRAFAST OPTICS (2). Introduction of ultrafast optical science; short pulse propagation in linear media; pulse stretching and compressing; Q-switching and mode-locking; characterization of femtosecond lasers; coherent optical effects. Offered in alternate years. **PREREQS:** Basic knowledge of electromagnetism and quantum mechanics.

PH 699. SPECIAL TOPICS: BIOLOGICAL PHYSICS (3).

SCHOOL OF LIFE SCIENCES

Undergraduate Majors Biochemistry and Biophysics Biology

Options
Biotechnology (Biology)
Genetics
Marine Biology
Pre-Education Biology

Microbiology Zoology

Option
Pre-Veterinary Medicine

Undergraduate Minors Biology Microbiology Zoology

Graduate Majors with Options Biochemistry and Biophysics

Graduate Areas of Concentration
Biochemistry, biophysics

Microbiology

Graduate Areas of Concentration
Environmental microbiology, food microbiology, genomics, immunology, microbial ecology, microbial evolution, parasitology, pathogenic microbiology, virology

Zoology

Graduate Areas of Concentration
Behavioral ecology, behavioral endocrinology, cell biology, chemical ecology, conservation biology, developmental biology, evolutionary biology, genetics, genomics, host-microbe interactions, marine ecology, paleontology, physiology, population biology

Graduate Minors Biochemistry and Biophysics Microbiology Zoology

The School of Life Sciences has three departments:

1. Biochemistry and Biophysics
2. Integrative Biology
3. Microbiology

DEPARTMENT OF BIOCHEMISTRY AND BIOPHYSICS

Gary F. Merrill, Chair

2011 Ag and Life Sciences
Oregon State University
Corvallis, OR 97331-7305
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Website: <http://biochem.science.oregon-state.edu>

FACULTY

Professors Baird, Barbar, Beckman, Frei, Hagen, Karplus, Merrill
Associate Professors Frietag, Gombart, Greenwood, Hsu, McFadden, Mehl

Assistant Professors Hendrix, Johnson, Perez

Senior Instructors Ahern, Rajagopal, Van Zee

Associate Professor, Senior Research Zhang

Assistant Professor Senior Research Nyarko

The Biochemistry and Biophysics major provides a foundation in both the physical and biological sciences. It is designed to help a student prepare for a career in the health sciences, for technical employment at the BS level, or for graduate study in the life sciences. Graduates of the department's programs have found challenging careers in medicine, dentistry, clinical chemistry, biotechnology, genetics, cell biology, forensic science, pharmacology, physiology, toxicology, and nutrition, as well as in biochemistry or biophysics. Others have used the degree as a springboard to nontechnical careers that benefit from a broad scientific background, including business, intellectual property law, journalism, and health care administration.

UNDERGRADUATE STUDIES

High school students interested in careers in biochemistry or biophysics should prepare for college by taking four years of mathematics and at least one year each of physics and chemistry. Additional course work in biology, computer science, written and spoken English, and foreign languages is highly desirable. Students transferring from a community college should have completed one year each of the following by the end of the sophomore year, if they plan to graduate in four years' total time: general chemistry, organic chemistry, calculus-based physics, and general biology. Three semesters or four quarters of college-level

math should have been taken, starting with calculus.

Biochemists and biophysicists find employment in colleges and universities, in medical schools, in government and private research institutes, in hospitals, and in industry. Industrial employers include chemical companies, food-processing plants, drug manufacturers, the cosmetic industry, and manufacturers of agricultural chemicals (fertilizers, pesticides, etc.). Biochemistry is extensively intertwined with biotechnology, which is the use of modern techniques in biology to achieve practical objectives. This has greatly expanded the industrial market for biochemists and biophysicists. The most rewarding careers require completion of a doctoral degree—PhD or a professional degree. This is essential for anyone who wants to direct an independent research program.

Dr. Kevin Ahern is the primary undergraduate advisor and is the one most familiar with undergraduate program requirements and career opportunities. The alternate advisors are Doctors Karplus, Rajagopal, and Van Zee. Also, students are encouraged to seek out any other member of the faculty for informal advice.

The department has one set of curricular requirements (see below), which lead to the BS degree in Biochemistry and Biophysics. All upper division students are encouraged to take additional elective courses in areas related to their major fields of interest (e.g., chemistry, microbiology, genetics, nutrition, physics, pharmacy, biology, or computer science). All students are strongly encouraged to carry out a research project in the laboratory of a faculty member.

DEPARTMENT OF INTEGRATIVE BIOLOGY

Virginia M. Weis, Co-Chair

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Website: <http://ib.oregonstate.edu/>

FACULTY

Professors Arnold, Blaustein, Blouin, De Leenheer, Giebultowicz, Hacker, Hixon, Houck, Lubchenco, Maddison, Mason, Menge, Sponaugle, Taylor, Weis
Associate Professors Denver, Lytle, Warrick, Zhang

Assistant Professors Chan, Henkel,

Jolles, Meyer, Milligan, Novak, Terry

Senior Instructors Blair, Cheung,

Lavery, Rajagopal

Instructors Kayes, Pepe, Quick, White

Professional Faculty Kneece,

Marshall, McLeod, Olarra

The undergraduate Biology major was created for students who wish to obtain broad, interdisciplinary training in the biological sciences. Biology provides students with a rigorous education coupled with practical scientific experience. The Biology major is ideal preparation for advanced graduate education in the biological sciences and professional schools in fields such as dentistry and medicine. It also prepares students well for a variety of careers in industry, government agencies, nonprofit organizations and academia. Recent graduates have entered such varied areas as biotechnology, pharmaceuticals, environmental policy, teaching, medicine, forensics, conservation, marine biology, biological illustration, field biology, and other environmental sciences.

Because of the interdisciplinary nature of the program, students majoring in biology may not seek a dual major or double degree in general science or zoology.

A major in zoology can prepare students for vocations that require foundations in biological science. It is an ideal major for advanced graduate education in biological science and for pre-professional preparation in medicine, dentistry, optometry, and veterinary medicine. In addition, zoology majors can enter such varied fields as environmental affairs, conservation, laboratory technology, education, scientific journalism, field biology, biomedical illustration, and other areas associated with biomedical and environmental sciences.

Zoology offers BS, MA, MS, and PhD degrees. Excellent opportunities exist for studies at field stations on the Pacific Coast, in the Great Basin Desert, and at other locations. In consultation with advisors, students can plan programs to meet their particular needs.

Because of the interdisciplinary nature of the program, students majoring in zoology may not seek a dual major or double degree in general science or biology.

GRADUATE STUDY

The Department of Integrative Biology has strong programs of graduate study in behavioral ecology, marine biology and ecology, evolutionary biology, physiology, behavioral endocrinology, population biology, genetics, genomics, chemical ecology, cell and developmental biology, host-microbe interactions and paleontology. Detailed information on the graduate faculty and program is available from the Department of Integrative Biology.

DEPARTMENT OF MICROBIOLOGY

Theo Dreher, Chair

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Website: <http://microbiology.science.oregonstate.edu/>

FACULTY

Professors Bartholomew, Bermudez, Bottomley, Dreher, Geller, Giovannoni, Kent, Ream, Sarker, Trempy

Associate Professors Field, Schuster

Assistant Professors Halsey, Lowry,

Mueller, Sharpton, Vega-Thurber

Senior Instructor/Advisor Bruslind

Instructor/Advisor Biesinger

Microbiology is concerned with the forms and activities of bacteria, archaea, fungi, protozoa, and viruses. It plays varied roles in the practical applications of technology and medicine, as well as in the most theoretical problems of biology. Microbiologists are involved in activities as different as the study of gene structure, the control of disease, and the industrial processes based on the ability of microorganisms to decompose and synthesize complex organic molecules. Microbiology is one of the most rewarding of professions because it provides the opportunity to be in contact with all the other natural sciences and thus to contribute in many different ways to the betterment of life.

UNDERGRADUATE STUDIES

Many fields of microbiology are available to students and research workers. These include fundamental areas such as the physiology, ecology, and genetics of microorganisms; and the applications of microbiology concerned with soil and water quality, food safety, immunology, and human, animal and plant diseases. Undergraduate studies prepare students for admission to professional schools, graduate programs in microbiology, and for positions in education and as health officers, sanitarians and biotechnicians in private industry, state and federal government.

High school students or community college transferees considering a career in microbiology will find it helpful to have a strong background in mathematics and chemistry. An excellent advising program is available to undergraduates, and prospective students are encouraged to consult with a departmental advisor or with faculty members working in an area of interest to them. Upper-division students are also encouraged to carry out a research project in the laboratory of a faculty member and/or to serve as an

undergraduate teaching assistant. Several partial scholarships are available for microbiology majors. For more information, contact a microbiology advisor.

GRADUATE STUDIES

The Department of Microbiology offers graduate programs leading to the Master of Science and Doctor of Philosophy degrees. Major fields of study in the program include molecular biology, microbial physiology, genetics, virology, soil and aquatic microbiology, immunology, pathogenic microbiology, and microbial genomes. The department also participates in the Master of Arts in Interdisciplinary Studies and the Master of Agriculture graduate programs. Students in both the master's and PhD programs are required to complete a research project leading to a thesis. Students pursuing the PhD degree must complete both written and oral qualifying examinations. Teaching and research assistantships are available.

For additional information, contact the department chair or other faculty members conducting research in areas that are of interest.

PROGRAMS UNDER THE SCHOOL OF LIFE SCIENCES

UNDERGRADUATE MAJORS WITH OPTIONS

BIOCHEMISTRY AND BIOPHYSICS (BS, HBS)

Freshman Year (48)

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)
 CH 231, CH 232, CH 233. *General Chemistry (4,4,4)
and CH 261, CH 262, CH 263.
 *Laboratory for Chemistry 231, 232, 233 (1,1,1)
 HHS 231. *Lifetime Fitness for Health (2)
 HHS 241–HHS 248. *Lifetime Fitness: (Various activities) (1)
 or any PAC course (1–2)
 MTH 251. *Differential Calculus (4)
 MTH 252. Integral Calculus (4)
 MTH 254. Vector Calculus (4)
 WR 121. *English Composition (3)
 Electives (3)

Sophomore Year (49)

BB 317. ^Scientific Theory and Practice (3)
 BI 311. Genetics (4)
 CH 334, CH 335, CH 336. Organic Chemistry (4,4,4)
 CH 361, CH 362. Experimental Chemistry (3,3)
 MTH 253. Infinite Series and Sequences (4)
 PH 211, PH 212, PH 213. *General Physics with Calculus (4,4,4)
 Electives (8)

*Junior Year (44)

BI 314. Cell and Molecular Biology (4) [Not required but strongly recommended.]
 BB 490, BB 491, BB 492. Biochemistry (3,3,3)

BB 493. Biochemistry Lab (3)
 and BB 496. Biochemistry Laboratory Molecular Modeling (1)
 BB 494. Biochemistry Lab (3)
 and BB 497. Basic Nucleic Acid and Protein Sequence Analysis (1)
 CH 440, CH 441, CH 442. Physical Chemistry (3,3,3)
 Electives (14)
 *CH 361 and 362 can be taken in the junior year with BB 493, BB 494, BB 496, BB 497 being taken in the senior year

Senior Year (45)

BB 481, BB 482, BB 483. Biophysics (3,3,3)
 Electives (36)

Total=182–186

BIOLOGY (BS, HBS)

Also available at OSU-Cascades campus.

Core Program

Freshman Year

BI 198. Biology Freshman Seminar (1)
 BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)
 CH 231, CH 232, CH 233. *General Chemistry (4,4,4) **and** CH 261, CH 262, CH 263. *Laboratory for Chemistry 231, 232, 233 (1,1,1)
or this series: CH 121. General Chemistry (5) **and** CH 122, CH 123. *General Chemistry (5,5)
 MTH 251. *Differential Calculus (4)
 and MTH 252. Integral Calculus (4)
 or MTH 268. Mathematical Ideas in Biology (4)
 WR 121. *English Composition (3)
 Required courses and/or electives (6)

Sophomore Year

BI 314. Cell and Molecular Biology (4)
or take BI 460. Cell Biology (3) **and** BI 461. Cell Biology Laboratory (2) in senior year
 BI 370. Ecology (3)
 CH 331, CH 332, CH 337. Organic Chemistry and Lab (4,4,4)
 PH 201, PH 202, PH 203. *General Physics (5,5,5)
 Complete Math Requirements (listed in freshman year)
 Required courses and/or electives (16)

Junior Year

BB 450, BB 451. General Biochemistry (4,3)
 BI 311. Genetics (4)
 MB 302. General Microbiology (3)
 MB 303. General Microbiology Laboratory (2)
 ST 351, ST 352. Introduction to Statistical Methods (4,4)

Choose one organismal biology from the following (3–5):

BI 358. Symbioses and the Environment (3)
 BOT 313. Plant Structure (4)
 BOT 321. Plant Systematics (4)
 BOT 416. Aquatic Botany (4)
 BOT 461. Mycology (5)
 MB 480. General Parasitology (3)
 Z 361. Invertebrate Biology (3)
 and Z 362. Invertebrate Biology Laboratory (2)
 Z 365. Biology of Insects (4)
 Z 371. Vertebrate Biology (3)

and Z 372. Vertebrate Biology Laboratory (2)
 Z 422. Comparative Anatomy (5)
 Z 477. Aquatic Entomology (4)

Senior Year

BI 445. Evolution (3)
Choose one physiology from below (3–5):
 BOT 331. Plant Physiology (4)
 BOT 488. Environmental Physiology of Plants (3)
 Z 423. Environmental Physiology (4)
 Z 425. Embryology and Development (5)
 Z 430. Principles of Physiology (4)
 Z 431. Vertebrate Physiology (4)
 Z 432. Vertebrate Physiology (4)

Choose one from the following (4):

Some of the courses may be counted for other categories—Bacc Core: Science Technology and Society and/or Writing Intensive Course (WIC). See those areas for details.

HSTS 414. *History of Twentieth-Century Science (4)
 HSTS 415. ^*Theory of Evolution and Foundation of Modern Biology (4)
 HSTS 416. *History of Medicine Pre-1800 (4)
 HSTS 417. ^*History of Medicine (4)
 HSTS 418. *Science and Society (4)
 HSTS 419. ^*Studies in Scientific Controversy: Methods and Practices (4)
 HSTS 422. ^*Historical Studies of Science and Politics (4)
 HSTS 425. ^*History of the Life Sciences (4)
 HSTS 437. ^History of Animals in Science (4)
 HSTS/FW 470. *Ecology and History: Landscapes of the Columbia Basin (4)
 PHL 325. *Scientific Reasoning (4)
 PHL 444. *Biomedical Ethics (4)
 PHL 470. Philosophy of Science (3)
 PHL 474. ^Philosophy of Biology (4)

Choose one writing intensive course (WIC) from the following (3–4):

Some of the courses in WIC may be counted for other requirements—Bacc Core: Science Technology & Society and/or Biology Upper-Division Science Electives. See those areas for details.

BB/BI 317. ^Scientific Theory and Practice (3)
 BI 306. ^*Environmental Ecology (3)
 or BI 306H. ^*Environmental Ecology (3)
 BI 315. ^Molecular Biology Laboratory (3)
 BI 371. ^Ecological Methods (3)
 BI/MB 385. ^Emerging Infectious Diseases and Epidemics (3)
 BI 388. ^Special Topics in Biology (3)
 BI 450. ^Marine Biology (16)
 BOT 323. ^Flowering Plants of the World (3)
 HSTS 415. ^*Theory of Evolution and Foundation of Modern Biology (4)
 HSTS 417. ^*History of Medicine (4)
 HSTS 419. ^*Studies in Scientific Controversy: Methods and Practices (4)
 HSTS 422. ^*Historical Studies of Science and Politics (4)
 HSTS 425. ^*History of the Life Sciences (4)
 HSTS 437. ^History of Animals in Science (4)
 MB 311. ^Molecular Microbiology Lab: A Writing Intensive Course (3)
 PHL 474. ^Philosophy of Biology (4)
or other WIC courses approved by the program chair.

Two additional 3–5 credit, upper-division (300–400), College of Science courses NOT used for the Biology requirements above and meeting the stipulations below:

Allowed:

- Science courses offered by departments in the College of Science (BB, BI, BOT, CH, GEO, ENSC, MB, MTH, PH, ST, and Z).
- Also College of Science courses taken for a double major, option, or minor.
- Non-History of Science writing intensive courses from the major list above.

Excluded:

- Blanket numbered courses (e.g. 309, 401, 405, 406, 407, 409, 410).
- Courses from the Human Anatomy and Physiology series Z 331–Z 333 and Z 341–Z 343.
- Any of the following: BB 350, BB 450, BB 451, BB 490, BB 491, BB 492, ST 314, Z 345.

Biology Major Field Test

Biology majors are required to take a comprehensive, two-hour Biology Major Field Test in order to graduate: BI 499. Special Topics/Senior Biology Major Field Test (0). For further information, go to <http://biology.science.oregonstate.edu/biology-major-field-test-information>.

Total=180

Footnotes:

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

OPTIONS

BIOTECHNOLOGY (BIOLOGY) OPTION

Required Courses (9)

BB 493. Biochemistry Laboratory (3)
BB 494. Biochemistry Laboratory (3)
MB 310. Bacterial Molecular Genetics (3)

Electives—Select a minimum of 12 credits from the following:

BB 332. *Molecular Medicine (3)
BOT 332. Experimental Plant Physiology (3)
HORT/PBG 441. Plant Tissue Culture (4)
MB 311. ^Molecular Microbiology Lab: A Writing Intensive Course (3)
MB 416, MB 417. Immunology, Immunology Lab (3,2)
MB 430. Pathogenic Microbiology (3)
MB 434. Virology (3)
MB 435. Pathogenic Microbes Laboratory (2)
MB 456. Microbial Genetics and Biotechnology (3)
MB 479. Fermentation Microbiology (3)

Total credits 21–22

Note: Courses used to satisfy the Biotechnology option requirements may only be used to satisfy the additional upper-division College of Science courses in the Biology major.

GENETICS OPTION

Required Courses (14)

BB 493. Biochemistry Laboratory (3)
BB 494. Biochemistry Laboratory (3)
MB 310. Bacterial Molecular Genetics (3)
MB 311. ^Molecular Microbiology Lab: A Writing Intensive Course (3)
MB 456. Microbial Genetics and Biotechnology (3)
MCB 530. Introduction to Population Genetics (3)
Z 425. Embryology and Development (5)

Total=23

Note: Courses used to satisfy the Genetics option requirements may only be used to satisfy the additional upper-division College of Science courses in the Biology major.

MARINE BIOLOGY OPTION

Biology majors can obtain a Marine Biology option by satisfying either Track 1 or Track 2 requirements.

Track I (21)

BI 450. ^Marine Biology (16) *Admission by application only. Taught at Hatfield Marine Science Center.*

Electives—Select a minimum of 5 credits from the following:

OC 331. Introduction to Oceanography (3) or OC 332. Coastal Oceanography (3) or OC 440. Introduction to Biological Oceanography (3)
Z 351. Marine Ecology (3)
Z 352. Marine Ecology Lab (2)
Z 464. Marine Conservation Biology (3)

Other Hatfield Marine Science Center summer courses may be used as electives only if approved by Brock McLeod, mcleodb@science.oregonstate.edu. See <http://hmsc.oregonstate.edu/studentinfo.html> for course offerings.

Track II (21–22)

BOT 416. Aquatic Botany (4)
Z 351. Marine Ecology (3)
Z 352. Marine Ecology Lab (2)
Z 361. Invertebrate Biology (3)
Z 362. Invertebrate Biology Lab (2) or Z 461. Marine and Estuarine Invertebrate Zoology (4)

Electives—Select a minimum of 5 credits from the following:

BI 358. Symbioses and the Environment (3)
FW 315. Ichthyology (3)
FW 316. Systematics of Fishes (2)
Z 464. Marine Conservation Biology (3)

And one of the OC courses below to complete electives (3):

OC 331. Introduction to Oceanography (3)
OC 332. Coastal Oceanography (3)
OC 440. Introduction to Biological Oceanography (3)

Other Hatfield Marine Science Center summer courses may be used as electives only if approved by Brock McLeod, mcleodb@science.oregonstate.edu. See <http://hmsc.oregonstate.edu/studentinfo.html> for course offerings.

Note: Courses used to satisfy the Marine Biology option requirements may

only be used to satisfy the additional upper-division College of Science courses in the Biology major.

PRE-EDUCATION BIOLOGY OPTION

CAUTION: The Pre-Education Biology option meets the requirements for most graduate teacher licensure programs. Students must check prerequisites at any school to which they apply for up-to-date information.

Required Courses (10–12 credits)

SED 407. Seminar: Science and Mathematics Education Orientation (2)
SED 412/SED 512. Technology Foundations for Teaching Math and Science (3)
SED 413/SED 513. Inquiry in Science and Science Education (3)
Select one adolescent psychology course from below:
HDFS 313. Adolescent Development (4)
TCE 412. Learning Styles and Needs in Adolescence (2)
TCE 512. Psychology of the Adolescent (3)

Practicum Experience

Select 3 or more credits involving middle and/or high school experience—this must total 60 hours or more of classroom experience:

SED 406. Projects: Fall Classroom Experience (1–3) *(Enrollment by permission of instructor)*
SED 409. Field Practicum: Science and Mathematics (3)
TCE 409. Practicum Experience (2–4)

PRE-EDUCATION BIOLOGY OPTION

Students must also complete additional courses from *at least one* of the specific tracks below to total 21 credits.

Chemistry Track (Middle and High School Endorsement)

Choose at least 6 credits from below:

BB 493. Biochemistry Laboratory (3)
CH 324. Quantitative Analysis (4)
CH 390. Environmental Chemistry (3)
CH 440. Physical Chemistry (3)

Integrated Science Track (Middle and High School Endorsement) (11–12 credits)

Choose two of the following courses:

GEO 201. *Physical Geology (4)
GEO 202. *Earth Systems Science (4)
GEO 203. *Evolution of Planet Earth (4)
Choose one of the following courses:
ATS 210. Introduction to Atmospheric Sciences (3)
GEO 201, GEO 202 or GEO 203 if not taken above
GEO 323. ^Climatology (4)
OC 331. Introduction to Oceanography (3)

Note: Courses used to satisfy the Pre-Education Biology option requirements may only be used to satisfy the additional upper-division College of Science courses in the Biology major.

MICROBIOLOGY (BS, HBS)

To receive the **BS degree in Microbiology**, a student must complete all university baccalaureate core requirements plus departmental requirements included in the list below.

- Majors must have 36 credits in microbiology with a minimum GPA of 2.00.
- Research (MB 401), Thesis (MB 403), and Reading and Conference (MB 405) cannot account for more than 3 of the required 36 microbiology credits.
- Special Projects (MB 406) can account for an additional 3 microbiology credits.
- Additional credits in these subjects will count toward elective credits.
- All required science courses must be taken for a grade.
- CH 324 may be taken with S/U grading; however, if taken S/U, the student will not receive a chemistry minor.
- 22 credits must come from the approved 400-level microbiology courses; to include MB 490 (2 credits) and 2 credits from 400-level laboratory courses.

Freshman Year (45)

BI 211, 212, 213. *Principles of Biology (4,4,4)
CH 231, CH 232, CH 233. *General Chemistry (4,4,4)
and CH 261, CH 262, CH 263.
*Laboratory for Chemistry 231, 232, 233 (1,1,1)

MB 110. Orientation to Microbiology (1)
MTH 251. *Differential Calculus (4)
MTH 252. Integral Calculus (4)
or MTH 268. Mathematical Ideas in Biology (4)
Fitness (3)
Speech (3)
Writing I (3)

Sophomore Year (46)

BI 314. Cellular and Molecular Biology (4)
CH 331, CH 332. Organic Chemistry (4,4)
CH 337. Organic Chemistry Laboratory (4)
MB 302. General Microbiology (3)
MB 303. General Microbiology Laboratory (2)
PH 201, PH 202, PH 203. *General Physics (5,5,5)
ST 351. Introduction to Statistical Methods (4)
Electives (3)
Writing II (3)

Junior Year (44)

BB 450. General Biochemistry (4)
BB 451. General Biochemistry (3)
CH 324. Quantitative Analysis (4)
MB 310. Bacterial Molecular Genetics (3)
MB 311. ^Molecular Microbiology Lab: A Writing Intensive Course (3)
MB 312. Bacterial Physiology and Metabolism (3)
Perspectives (15)
Synthesis (6)
Electives (3)

Senior Year (45)

MB 490. Microbiology Capstone Experience (2)

Select 20 credits from the approved 400-level microbiology courses below (2 credits of which must come from 400-level laboratory courses):

MB 401. Research (1–16)
MB 405. Reading and Conference (3)
MB 406. Special Projects (2–3)
MB 407. Seminar (1)
MB 410. Occupational Internship (3)
MB 416. Immunology (3)
MB 417. Immunology Laboratory (2)
MB 420. Microbial Genomes, Biogeochemistry, and Diversity (3)
MB 430. Bacterial Pathogenesis (3)
MB 434. Virology (3)
MB 435. Pathogenic Microbes Laboratory (2)
MB 440. Food Microbiology (3)
MB 441. Food Microbiology Laboratory (2)
MB 448. Microbial Ecology (3)
MB 456. Microbial Genetics and Biotechnology (3)
MB 479. Fermentation Microbiology (3)
MB 480. General Parasitology (3)
MB 491. Fish Diseases in Conservation Biology and Aquaculture (4)
MB 499. Special Topics (2)

Total=180

Note: Microbiology majors planning advanced professional training in medicine, should consult a pre-medical, clinical lab science or other appropriate advisor.

ZOOLOGY (BA, BS, HBA, HBS)

All students majoring in zoology are required to take a common core of courses.

Baccalaureate Core Courses (33 total credits)**Zoology Core Courses****Non-Biological Sciences Requirements (52 credits)**

BB 450, BB 451. General Biochemistry (4,3)
CH 231, CH 232, CH 233. *General Chemistry (4,4,4)
and CH 261, CH 262, CH 263.
*Laboratory for Chemistry 231, 232, 233 (1,1,1)
or an acceptable chemistry substitute
CH 331, CH 332. Organic Chemistry (4,4)
MTH 251. *Differential Calculus (4)
MTH 252. Integral Calculus (4)
PH 201, PH 202. *General Physics (5,5)
ST 351. Introduction to Statistical Methods (4)

Biological Sciences Requirements (40 credits)

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)
BI 311. Genetics (4)
BI 314. Cell and Molecular Biology (4)
BI 370. Ecology (3)
BI 445. Evolution (3)
Z 361. Invertebrate Biology (3)
Z 362. Invertebrate Biology Lab (2)
Z 371. Vertebrate Biology (3)
Z 372. Vertebrate Biology Lab (2)

Z 430. Principles of Physiology (4)
or Z 431. Vertebrate Physiology (4)
or Z 432. Vertebrate Physiology (4)

Writing Intensive Course (WIC) (3 credits)

Choose one of the following:

BI 371. ^Ecological Methods (3)
BI 388. ^Special Topics in Biology (3)
HSTS 415. ^Theory of Evolution and Foundation of Modern Biology (4)
HSTS 417. ^History of Medicine (4)
HSTS 419. ^Studies in Scientific Controversy: Methods and Practices (4)
HSTS 422. ^*Historical Studies of Science and Politics (4)
HSTS 425. ^History of the Life Sciences (4)
HSTS 437. ^History of Animals in Science (4)

Biological Science Electives (18 credits)

Choose upper-division biological sciences courses in consultation with your advisor. These must be approved by your advisor.

Required Courses:

Choose from the following course selections to reach a total of 18 credits.

Cell/Molecular area (6–9):

BI 358. Symbioses and the Environment (3)
BI 460. Cell Biology (3)
BI 461. Cell Biology Lab (2)
MB 302. General Microbiology (3)
MB 303. General Microbiology Lab (2)
MB 416. Immunology (3)
MB 420. Microbial Genomes, Biogeochemistry, and Diversity (3)
Z 425. Embryology and Development (5)
Z 440. Insect Physiology (3)

Organismal/Physiology area (6–9):

BI 350. Animal Behavior (3)
or Z 350. Animal Behavior (3)
BOT 321. Plant Systematics (4)
FW 311. Ornithology (3)
FW 315. Ichthyology (3)
FW 317. Mammalogy (3)
Z 315. Dinosaur Biology (3)
Z 365. Biology of Insects (4)
Z 422. Comparative Anatomy (5)
Z 423. Environmental Physiology (4)
Z 425. Embryology and Development (5)
Z 430. Principles of Physiology (4)
or Z 431. Vertebrate Physiology (4)
or Z 432. Vertebrate Physiology (4)
Z 440. Insect Physiology (3)
Z 473. Herpetology (3)
Z 474. Systematic Herpetology (2)
Z 477. Aquatic Entomology (4)

Ecology/Evolution/Conservation Biology areas (6–9):

BOT 341. Plant Ecology (4)
ENT 420. Insect Ecology (3)
HSTS 415. *Theory of Evolution and Foundation of Modern Biology (4)
Z 351. Marine Ecology (3)
Z 352. Marine Ecology Lab (2)
Z 427. Paleobiology (3)
Z 464. Marine Conservation Biology (3)
Z 477. Aquatic Entomology (4)
Z 481. Biogeography (3)

Electives (35 credits)**Total Credits for BS in Zoology=180****PRE-VETERINARY MEDICINE OPTION**

ANS 121. Introduction to Animal Science (4)
 ANS 311. Principles of Animal Nutrition (3)
 CH 337. Organic Chemistry Laboratory (4)
 MB 302. General Microbiology (3)
 MB 303. General Microbiology Laboratory (2)
 PH 203. *General Physics (5)
 VMB 110. Preveternary Medicine (1)
 (Recommended)
 Z 410. Occupational Internship (at least 3 credits)
 or relevant experience

Total=25**UNDERGRADUATE MINORS****BIOLOGY MINOR**

The minor in Biology includes a required introductory biology sequence with a chemistry prerequisite or corequisite (BI 211, BI 212, BI 213, *Principles of Biology), a required course in cell and molecular biology (BI 314) and 13 or more credits of upper-division courses offered under the elective areas listed below. Equivalent courses taken at other institutions may be substituted. Any substitutions must be approved by the Biology Program office. **No upper-division course used to satisfy a major requirement may be used to fulfill the physiology, ecology and systematics, evolution, or genetics elective areas below.**

Required (16)

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

BI 314. Cell and Molecular Biology (4)

Electives:

Choose one course in each of the following subject areas:

Physiology:

BOT 331. Plant Physiology (4)
 Z 423. Environmental Physiology (4)
 Z 425. Embryology and Development (5)
 Z 430. Principles of Physiology (4)
 Z 431. Vertebrate Physiology (4)
 Z 432. Vertebrate Physiology (4)

Ecology and Systematics:

BI 370. Ecology (3)
 BOT 341. Plant Ecology (4)
 BOT 425. Flora of the Pacific Northwest (3)
 ENT 420. Insect Ecology (3)
 MB 448. Microbial Ecology (3)
 Z 351. Marine Ecology (3)
 Z 361. Invertebrate Biology (3)
 Z 365. Biology of Insects (4)
 Z 371. Vertebrate Biology (3)

Evolution:

BI 445. Evolution (3)
 HSTS 415. *^Theory of Evolution and Foundation of Modern Biology (4)
 Z 345. *Introduction to Evolution (3)

Genetics:

BI 311. Genetics (4)
 MB 310. Bacterial Molecular Genetics (3)
 MCB 530. Introduction to Population Genetic (3)

Total=29 or more credits**MICROBIOLOGY MINOR**

The Microbiology minor is designed for students from other majors who have an additional interest in microbiology.

Required Core

MB 302. General Microbiology (3)
 MB 303. General Microbiology Lab (3)
 MB 310. Bacterial Molecular Genetics (3)
 MB 311. ^Molecular Microbiology Lab: A Writing Intensive Course (3)
 MB 312. Bacterial Physiology and Metabolism (3)

Plus 13 additional credits of upper-division microbiology courses selected after consultation with the head advisor in the Department of Microbiology.

Two of the 13 credits must come from 400-level laboratory courses. Not more than 3 of the 13 upper-division credits can consist of MB 401, Research. Other blanket courses cannot be used to satisfy the minor requirement. All of these courses must be graded, not S/U.

Total=27**ZOOLOGY MINOR**

The Zoology minor is designed for students from other majors who have an additional interest in zoology. Students may be assigned a minor advisor in the Department of Zoology if they request. Completion of the minor is certified on the student's academic transcript.

Core Requirements

BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)
 Z 361, Z 362. Invertebrate Biology and Lab (3,2)
 Z 371, Z 372. Vertebrate Biology and Lab (3,2)

Add two or more courses from the following list:

BI 311. Genetics (4)
 BI 350. Animal Behavior (3)
 or Z 350. Animal Behavior (3)
 BI 370. Ecology (3)
 BI 445. Evolution (3)
 BI 460. Cell Biology (3)
 Z 351. Marine Ecology (3)
 Z 365. Biology of Insects (4)
 Z 422. Comparative Anatomy (5)
 Z 423. Environmental Physiology (4)
 Z 425. Embryology and Development (5)
 Z 427. Paleobiology (3)
 Z 430. Principles of Physiology (4)
 or Z 431. Vertebrate Physiology (4)
 or Z 432. Vertebrate Physiology (4)
 Z 440. Insect Physiology (3)
 Z 473. Herpetology (3)
 Z 477. Aquatic Entomology (4)

GRADUATE MAJORS**BIOCHEMISTRY AND BIOPHYSICS (MA, MS, PhD, MAIS)****Graduate Areas of Concentration**
Biochemistry, biophysics

The Department of Biochemistry and Biophysics offers graduate work leading to the Master of Science, Master of Arts, and Doctor of Philosophy degrees. Most graduate students are admitted for study toward the PhD.

The PhD program requires course work in biochemistry and biophysics, passing written and oral examinations, participating in the departmental seminar program, and research leading to a doctoral thesis. Although most students in the department receive financial support in the form of research assistantships, all students are expected to participate to a limited amount in the teaching program of the department, regardless of the source of support. In general, financial support is provided for PhD candidates only.

MICROBIOLOGY (MA, MS, PhD)**Graduate Areas of Concentration**
Environmental microbiology, food microbiology, genomics, immunology, microbial ecology, microbial evolution, parasitology, pathogenic microbiology, virology

The Department of Microbiology offers graduate programs leading to the Master of Science, Master of Arts, and Doctor of Philosophy degrees. Major fields of study are diverse and include basic and applied aspects of virology and bacteriology; immunology and pathogenic microbiology; environmental and applied microbiology, and microbial evolution. Students may minor in a variety of related disciplines in the life sciences, such as molecular and cellular biology and biochemistry. Integrated minors are often selected in order to allow students to develop a program that best serves their needs.

The principal objectives of the graduate major in Microbiology are completion of a comprehensive research project and preparation of a thesis. Student programs and research projects are developed with the major professor and are subject to approval by a committee of graduate faculty members. Microbiology research facilities are excellent and well-equipped.

For more information, write to Jerri Bartholomew, Professor, Department of Microbiology, 220 Nash Hall, OSU, Corvallis OR 97331-3804 or email: jerri.bartholomew@oregonstate.edu.

Students in the Microbiology Graduate Program are required to take the following core sequence of courses during their first year of enrollment in the program:

GRAD 520. Responsible Conduct of Research (1)

MB 511. Scientific Skills (1)

MB 512. Highlights of Microbiology (1)

MB 513. Microbial Systems (3)

ZOOLOGY (MA, MS, PhD)

Graduate Areas of Concentration

Behavioral ecology, behavioral endocrinology, cell biology, chemical ecology, conservation biology, developmental biology, evolutionary biology, genetics, genomics, host-microbe interactions, marine ecology, paleontology, physiology, population biology

The Department of Zoology offers graduate work leading toward the Master of Arts, Master of Science, and Doctor of Philosophy degrees in all areas of biology ranging from molecular to community levels.

At present there are active research programs involving graduate students in the study of comparative immunobiology and pathology; cellular interactions and tissue differentiation; neuronal development; cytogenetics; behavioral biology at the neurophysiological, endocrinological, and ecological levels; environmental physiology; vertebrate functional morphology; reproductive biology; natural products chemistry; marine biology; physiologic and biochemical adaptation; genetics and evolution of populations; experimental marine, terrestrial, and freshwater population and community ecology; biodiversity and conservation biology.

Research is conducted in laboratories on campus, at the Malheur Field Station in southeastern Oregon, at the Hatfield Marine Science Center in Newport, the H.J. Andrews Experimental Forest, and in natural areas of the Cascade Mountains and Willamette Valley. Students also have entered into cooperative research programs in other departments, with the Oregon Health and Science University in Portland, and with the Primate Research Center in Beaverton.

As part of their training, all students participate in the departmental seminar program, and doctoral students spend at least one year as teaching assistants. Most students are supported by graduate teaching or research assistantships. Students are expected to have broad competency in biology. The master's program leads to a thesis or research report (nonthesis option) on a specific problem; the PhD program emphasizes independent thesis research on a major topic at the forefront of the chosen field.

BIOCHEMISTRY AND BIOPHYSICS GRADUATE MINOR

Required (15)

BB 550, BB 551. General Biochemistry (4,3) or BB 590, BB 591, BB 592. Biochemistry (3,3,3)

Plus BB-related graduate level courses with BB graduate advisor approval (6–8)

Pre-approved Courses

BB 581. Biophysics (3)

BB 582. Biophysics (3)

BB 583. Biophysics (3)

BB 593. Biochemistry Laboratory (3)

BB 594. Biochemistry Laboratory (3)

BB 650. Selected Topics in Biochemistry and Biophysics: *Cell cycle and cancer* (3)

BB 650. Selected Topics in Biochemistry and Biophysics: *Protein evolution* (3)

BB 651. Selected Topics in Biochemistry and Biophysics: *Epigenetics* (3)

BB 651. Selected Topics in Biochemistry and Biophysics: *Macromolecular Interactions* (3)

BB 651. Selected Topics in Biochemistry and Biophysics: *Membrane Biochemistry* (3)

BB 651. Selected Topics in Biochemistry and Biophysics: *Protein NMR Spectroscopy* (3)

BB 651. Selected Topics in Biochemistry and Biophysics: *Protein Homeostasis, Aging, Disease* (3)

BB 652. Selected Topics in Biochemistry and Biophysics: *Oxidative Stress* (3)

BB 652. Selected Topics in Biochemistry and Biophysics: *Protein X-ray Crystallography* (3)

BB 654. Proteins (3)

MCB 525. Techniques in Molecular and Cellular Biology (3)

MCB 554. Genome Organization, Structure, and Maintenance (4)

MCB 555. Genome Expression and Regulation (4)

MCB 556. Cell and Developmental Biology (4)

MICROBIOLOGY GRADUATE MINOR

For more details, see the departmental advisor.

ZOOLOGY GRADUATE MINOR

For more details, see the departmental advisor.

BIOCHEMISTRY AND BIOPHYSICS COURSES

BB 100. THE MOLECULES OF LIFE (2).

A brief introduction to molecular biology for nonspecialists. Subjects vary, but have included biochemical basis of the origin of life, biochemical genetics, biochemical aspects of memory and behavior, mutagenesis, bioenergetics and nutrition, and environmental biochemistry.

BB 111. INTRODUCTION TO BIOCHEMISTRY AND BIOPHYSICS RESEARCH (1). Designed to introduce biochemistry and biophysics students to departmental research opportunities and advisors.

BB 317. ^SCIENTIFIC THEORY AND PRACTICE (3). Teaches students the practice of biological science. Topics cover scientific theory, communications, and critical evaluation. **CROSSLISTED** as BI 317. (Writing Intensive Course) **PREREQS:** (BI 213 or BI 213H) and/or equivalent.

BB 331. *INTRODUCTION TO MOLECULAR BIOLOGY (3). Course dealing with the molecular

basis of cellular function, with emphasis upon modern developments, and the foundation for practical applications of this knowledge. The course will involve the conceptual background necessary to appreciate the applications of molecular biology. Throughout the course opportunities will be given to discuss public policy issues and questions: What are the moral and practical problems that flow from identification of an individual as being at risk for a late-appearing genetic disorder, such as Huntington's disease or certain cancers? Does the scientific or public value of knowing the entire DNA sequence of the human genome justify a situation in which individual or small-scale research cannot be supported? What issues arise when the fruits of biological research, mostly publicly funded, are commercialized? Should a novel organism be patented? How can biotechnology be applied to environmental problems? (Bacc Core Course) **PREREQS:** (CH 122 or CH 202 or CH 222 or CH 225H or (CH 232 or CH 232H) or (CH 262 or CH 262H or CH 272))

BB 332. *MOLECULAR MEDICINE (3). Provides students an understanding of medical advances from a rapidly evolving molecular point of view. Advances in knowledge of the human genome arising from DNA sequencing efforts and major leaps in understanding of the regulating cellular growth and division are presented in an easy-to-understand fashion appropriate for students in all majors. Course discussions and assignments will cover implications of advances in molecular medicine from ethical, economic, technical and societal standpoints. The aim of the course is to present technical material in a way that non-scientists will understand and conversely to summarize ethical, economic, and philosophical considerations in a way that the scientists understand the implications of these technologies. (Bacc Core Course) **PREREQS:** Any biology course.

BB 350. ELEMENTARY BIOCHEMISTRY (4). Service course for students desiring a short introduction to biochemistry. Four lectures weekly. **PREREQS:** (CH 331 and CH 332*) and/or equivalent.

BB 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

BB 399H. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

BB 401. UNDERGRADUATE RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

BB 401H. UNDERGRADUATE RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

BB 403. THESIS (1-16). **PREREQS:** Departmental approval required.

BB 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

BB 405H. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

BB 407. BIOCHEMISTRY/BIOPHYSICS SEMINAR (1-16). Informal seminars presenting information about research problems and careers and research programs on campus in biochemistry or biophysics. This course is repeatable for a maximum of 99 credits.

BB 407H. BIOCHEMISTRY/BIOPHYSICS SEMINAR (1-16). Informal seminars presenting information about research problems and careers and research programs on campus in biochemistry or biophysics. This course is repeatable for a maximum of 99 credits. **PREREQS:** Honors College approval required.

BB 410. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits.

BB 450. GENERAL BIOCHEMISTRY (4). Sequence course for students with a limited background in physical chemistry. BB 450/BB 550, three lectures and one recitation. BB 451/BB 551, three lectures. **PREREQS:** (CH 332 or CH 336) and BB 450 and BB 451 must be taken in order.

BB 450H. GENERAL BIOCHEMISTRY (4). Sequence course for students with a limited background in physical chemistry. BB 450/BB 550, three lectures and one recitation. BB 451/BB 551, three lectures. **PREREQS:** (CH 332 or CH 336) and BB 450 and BB 451 must be taken in order. Honors College approval required.

BB 451. GENERAL BIOCHEMISTRY (3). Sequence course for students with a limited background in physical chemistry. BB 450/BB 550, three lectures and one recitation. BB 451/BB 551, three lectures. **PREREQS:** (BB 450 or BB 450H) and BB 450 and BB 451 must be taken in order.

BB 451H. GENERAL BIOCHEMISTRY (3). Sequence course for students with a limited background in physical chemistry. BB 450/BB 550, three lectures and one recitation. BB 451/BB 551, three lectures. **PREREQS:** (BB 450 or BB 450H) and BB 450 and BB 451 must be taken in order. Honors College approval required.

BB 481. BIOPHYSICS (3). Sequence professional course covering quantitative properties of biological systems and biological phenomena using concepts derived from mathematics and physics. **PREREQS:** CH 442

BB 482. BIOPHYSICS (3). Sequence professional course covering quantitative properties of biological systems and biological phenomena using concepts derived from mathematics and physics. **PREREQS:** (BB 481 and CH 442)

BB 483. BIOPHYSICS (3). Sequence professional course covering quantitative properties of biological systems and biological phenomena using concepts derived from mathematics and physics. **PREREQS:** (BB 482 and CH 442)

BB 490. BIOCHEMISTRY (3). Sequence professional course to meet the requirements of majors in biochemistry and biophysics. **PREREQS:** (CH 332 or CH 336) and BB 490, BB 491, BB 492 must be taken in order.

BB 491. BIOCHEMISTRY (3). Sequence professional course to meet the requirements of majors in biochemistry and biophysics. **PREREQS:** (BB 490 or BB 590)

BB 492. BIOCHEMISTRY (3). Sequence professional course to meet the requirements of majors in biochemistry and biophysics. **PREREQS:** BB 491 and CH 441. Should concurrently enroll in CH 440 and CH 441 and CH 442.

BB 493. BIOCHEMISTRY LABORATORY (3). Laboratory course to accompany BB 450, BB 451 or BB 490, BB 491, BB 492. Lec/lab/rec. **PREREQS:** Need not be taken in sequence.

BB 494. BIOCHEMISTRY LABORATORY (3). Laboratory to accompany BB 450, BB 451 or BB 490, BB 491, BB 492. Lec/lab. **PREREQS:** Need not be taken in sequence.

BB 496. BIOCHEMISTRY LABORATORY MOLECULAR MODELING (1). A computer-based course to introduce students from biochemistry and related fields to the fundamentals of protein structure and to hands-on manipulation of three-dimensional images. **COREQS:** BB 493

BB 497. BASIC NUCLEIC ACID AND PROTEIN SEQUENCE ANALYSIS (1). Computer-based course teaching students how to analyze nucleic acid and protein sequences. **COREQS:** BB 494

BB 499. SPECIAL TOPICS (3).

BB 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

BB 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

BB 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

BB 507. SEMINAR (1-2). Section 1: Descriptions of campus research programs in biochemistry and biophysics, 1 credit fall. Graded P/N. Student presentations of current research literature, 1 credit winter and spring. Should be taken by all entering departmental graduate students. Section 2: Presentation of departmental research seminar, 2 credits any term. PhD candidates in biochemistry and biophysics present a departmental research seminar in the third or fourth year. One registers in the term the seminar is presented. This course is repeatable for a maximum of 16 credits.

BB 550. GENERAL BIOCHEMISTRY (4). Sequence course for students with a limited background in physical chemistry. BB 450/BB 550, three lectures and one recitation. BB 451/BB 551 and BB 452, three lectures. **PREREQS:** CH 332, BB 550, BB 551 must be taken in order.

BB 551. GENERAL BIOCHEMISTRY (3). Sequence course for students with a limited background in physical chemistry. BB 450/BB 550, three lectures and one recitation. BB 451/BB 551 and BB 452, three lectures. **PREREQS:** BB 550

BB 581. BIOPHYSICS (3). Sequence professional course covering quantitative properties of biological systems and biological phenomena using concepts derived from mathematics and physics. **PREREQS:** CH 442

BB 582. BIOPHYSICS (3). Sequence professional course covering quantitative properties of biological systems and biological phenomena using concepts derived from mathematics and physics. **PREREQS:** BB 581 and CH 442

BB 583. BIOPHYSICS (3). Sequence professional course covering quantitative properties of biological systems and biological phenomena using concepts derived from mathematics and physics. **PREREQS:** BB 582 and CH 442

BB 590. BIOCHEMISTRY (3). Sequence professional course to meet the requirements of majors in biochemistry and biophysics. **PREREQS:** BB 590, BB 591, BB 592 must be taken in order.

BB 591. BIOCHEMISTRY (3). Sequence professional course to meet the requirements of majors in biochemistry and biophysics. **PREREQS:** BB 590 and/or BB 490

BB 592. BIOCHEMISTRY (3). Sequence professional course to meet the requirements of majors in biochemistry and biophysics. **PREREQS:** CH 591. Concurrent registration in CH 440 and CH 441 and CH 442 is recommended but not required.

BB 593. BIOCHEMISTRY LABORATORY (3). Laboratory course to accompany BB 450, BB 451 or BB 490, BB 491, BB 492. Lec/lab/rec. **PREREQS:** Need not be taken in sequence.

BB 594. BIOCHEMISTRY LABORATORY (3). Laboratory to accompany BB 450, BB 451 or BB 490, BB 491, BB 492. Lec/lab. **PREREQS:** Need not be taken in sequence.

BB 596. BIOCHEMISTRY LABORATORY MOLECULAR MODELING (1). A computer-based course to introduce students from biochemistry and related fields to the fundamentals of protein structure and to hands-on manipulation of three-dimensional images. **COREQS:** BB 593

BB 597. BASIC NUCLEIC ACID AND PROTEIN SEQUENCE ANALYSIS (1). Computer-based course teaching students how to analyze nucleic acid and protein sequences. **COREQS:** BB 594

BB 599. SPECIAL TOPICS (3).

BB 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

BB 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

BB 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

BB 607. SEMINAR (1-2). Section 1: Descriptions of campus research programs in biochemistry and biophysics, 1 credit fall. Graded P/N. Student presentations of current research literature, 1 credit winter and spring. Should be taken by all entering departmental graduate students. Section 2: Presentation of departmental research seminar, 2 credits any term. PhD candidates in biochemistry and biophysics present a departmental research seminar in the third or fourth year. One registers in the term the seminar is presented. This course is repeatable for a maximum of 16 credits.

BB 650. SELECTED TOPICS IN BIOCHEMISTRY AND BIOPHYSICS (3). Nonsequence courses designed to acquaint student with current research in biochemistry and biophysics. Courses include enzyme kinetics, cell cycle and cancer, neurochemistry, oxidative stress, cell adhesion and motility. Most courses offered alternate years. This course is repeatable for a maximum of 18 credits.

BB 651. SELECTED TOPICS IN BIOCHEMISTRY AND BIOPHYSICS (3). Nonsequence courses designed to acquaint student with current research in biochemistry and biophysics. Courses include cell surfaces, enzyme kinetics, metabolism, neurochemistry, trace element metabolism, biological oxidations, and bioenergetics. Most courses offered alternate years. This course is repeatable for a maximum of 18 credits.

BB 652. SELECTED TOPICS IN BIOCHEMISTRY AND BIOPHYSICS (3). Nonsequence courses designed to acquaint student with current research in biochemistry and biophysics. Courses include enzyme kinetics, metabolism, neurochemistry, trace element metabolism, biological oxidations, and bioenergetics. Most courses offered alternate years. This course is repeatable for a maximum of 18 credits.

BB 654. PROTEINS (3). Advanced treatment of protein structure and function. **PREREQS:** (BB 451 or BB 551) and (BB 492 or BB 592) or equivalent

BB 662. HORMONE ACTION (3). Mechanisms of action of peptide and steroid hormones and related compounds at the cellular level. **CROSSLISTED** as ANS 662, MCB 662, PHAR 662. **PREREQS:** BB 451 or BB 551 or BB 492 or BB 592

BB 664. PHYSICAL METHODS IN BIOPHYSICS AND BIOCHEMISTRY (3). Important techniques for studying biopolymers and biological systems. Not offered every year. **PREREQS:** BB 483 or BB 583

■ BIOLOGY COURSES

BI 101. *GENERAL BIOLOGY (4). Diversity of life, ecology, population biology, and human environmental impacts. An introductory course in the principles and methods of biology, intended for majors in fields other than the biological sciences. Lec/lab/rec. (Bacc Core Course)

BI 102. *GENERAL BIOLOGY (4). Mendelian genetics, molecular genetics, human genetics, genetic engineering, evolution, and behavior. An introductory course in the principles and methods of biology, intended for majors in fields other than the biological sciences. Lec/lab. (Bacc Core Course)

BI 103. *GENERAL BIOLOGY (4). Human anatomy and physiology, and human diseases. An introductory course in the principles and methods of biology, intended for majors in fields other than the biological sciences. Lec/lab. (Bacc Core Course)

BI 107. HEALTH PROFESSIONS: DENTAL (1). Discussion of matters relating to a dental career. Includes application procedures, the importance of various requirements, admissions, professional school curricula, financing education and related matters. Speakers are included. Graded P/N.

BI 109. HEALTH PROFESSIONS: MEDICAL (1). Discussion of matters relating to a medical career. Includes application procedures, the importance of various requirements, admissions, professional school curricula, financing education, and related matters. Speakers are included. Graded P/N.

BI 111. INTRODUCTION TO MARINE LIFE IN THE SEA (1). A field-focused learning experience, this inquiry-based course is a basic overview of the marine life and environment on the Oregon coast, including rocky shores, sandy beaches, mud flats, bays, estuaries, and watersheds. Through lectures, lab and field experiences, students will examine important marine organisms in their habitat; exploring their ecological niches and adaptations to their environment along the Oregon coast. Graded P/N. **CROSSLISTED** as FW 111. **PREREQS:** High school biology and chemistry.

BI 150. INTRODUCTION TO MARINE BIOLOGY (4). Survey of marine organisms, evolution of marine life, habitats and communities of ocean zones, productivity and marine resources along the Oregon coast. Hands-on course explores unique adaptations, diversity and ecological importance of organisms in the marine environment. Field trips. Lec/lab. Taught at Hatfield Marine Science Center.

BI 198. BIOLOGY FRESHMAN SEMINAR (1). Presentations made by eminent teachers and researchers who will discuss various aspects of biology. Open to first-year students and sophomores in biology, undeclared science, and UESP. Graded P/N.

BI 199. SELECTED TOPICS (1-8). This course is repeatable for a maximum of 8 credits.

BI 199H. SELECTED TOPICS (1-8). This course is repeatable for a maximum of 8 credits. **PREREQS:** Honors College approval required.

BI 211. *PRINCIPLES OF BIOLOGY (4). Origins of life, energy transformations, plant and animal diversity. Lec/lab. (Bacc Core Course) **PREREQS:** For life science majors and pre-professional students.

BI 211H. *PRINCIPLES OF BIOLOGY (4). Origins of life, energy transformations, plant and animal physiology. Lec/lab. (Bacc Core Course) **PREREQS:** For life science majors and pre-professional students. Honors College approval required.

BI 212. *PRINCIPLES OF BIOLOGY (4). Cell biology, organ systems, plant and animal physiology. Lec/lab. (Bacc Core Course) **PREREQS:** (CH 121* or CH 201* or CH 221* or CH 224H* or ((CH 231* or CH 231H*) and (CH 261* or CH 261H* or CH 271*)) and for life science majors and pre-professional students.

BI 212H. *PRINCIPLES OF BIOLOGY (4). Cell biology, organ systems, plant and animal physiology. Lec/lab. (Bacc Core Course) **PREREQS:** (CH 121* or CH 201* or CH 221* or CH 224H* or ((CH 231* or CH 231H*) and (CH 261* or CH 261H* or CH 271*)) and for life science majors and pre-professional students. Honors College approval required.

BI 213. *PRINCIPLES OF BIOLOGY (4). Genetics, evolution, natural selection, and ecology. Lec/lab. (Bacc Core Course) **PREREQS:** (CH 121 or CH 201 or CH 221 or CH 224H or ((CH 231 or CH 231H) and (CH 261 or CH 261H or CH 271)) and for life science majors and pre-professional students.

BI 213H. *PRINCIPLES OF BIOLOGY (4). Genetics, evolution, natural selection, and ecology. Lec/lab. (Bacc Core Course) **PREREQS:** (CH 121 or CH 201 or CH 221 or CH 224H or ((CH 231 or

CH 231H) and (CH 261 or CH 261H or CH 271)) and for life science majors and pre-professional students. Honors College approval required.

BI 299. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

BI 300. *PLAGUES, PESTS, AND POLITICS (3). Integration and interaction of agricultural and public health aspects of entomology in society and history. **CROSSLISTED** as ENT 300 and HORT 330. (Bacc Core Course)

BI 301. *HUMAN IMPACTS ON ECOSYSTEMS (3). Selected human impacts on ecosystems are examined in depth, including air quality, global climate change, management of agricultural and forest resources, and threats to biological diversity. The causes, approaches to investigating, and potential solutions for each issue are discussed from a scientific and social perspective. Adverse effects on ecosystems that result from each environmental problem are examined. (Bacc Core Course) **PREREQS:** One year of college biology or chemistry and junior standing required.

BI 302. BIOLOGY AND CONSERVATION OF MARINE MAMMALS (4). An examination of the biology of whales, pinnipeds, and other marine mammals, include general adaptations to a marine existence; systematics and biogeography; reproduction; diving physiology; communication and echolocation; feeding and migratory behavior; and marine mammal/human interactions, including conservation issues. **CROSSLISTED** as FW 302. Taught at Hatfield Marine Science Center, OR online through Ecampus. **PREREQS:** One year of introductory biology is mandatory.

BI 306. *ENVIRONMENTAL ECOLOGY (3). Biological, physical, and chemical nature of both natural and human-disturbed ecosystems. Topics include population and conservation ecology, toxins in the food chain and in the environment, forest decline and acid rain, eutrophication of terrestrial and aquatic ecosystems, and ecosystem restoration. Offered alternate years. (Bacc Core Course) (Writing Intensive Course) **PREREQS:** One year of college biology and chemistry.

BI 306H. *ENVIRONMENTAL ECOLOGY (3). Biological, physical, and chemical nature of both natural and human-disturbed ecosystems. Topics include population and conservation ecology, toxins in the food chain and in the environment, forest decline and acid rain, eutrophication of terrestrial and aquatic ecosystems, and ecosystem restoration. Offered alternate years. (Bacc Core Course) (Writing Intensive Course) **PREREQS:** One year of college biology and chemistry. Honors College approval required.

BI 311. GENETICS (4). Fundamentals of Mendelian, quantitative, population, molecular, and developmental genetics. Lec/rec. **PREREQS:** ((BI 211 or BI 211H) and (BI 212 or BI 212H) and (BI 213 or BI 213H))

BI 314. CELL AND MOLECULAR BIOLOGY (4). Fundamental concepts of prokaryotic and eukaryotic cell biology. Emphasizes cell structure and function at the molecular level. Lec/rec. **PREREQS:** ((BI 211 or BI 211H) and (BI 212 or BI 212H) and (BI 213 or BI 213H) and (CH 331* or CH 334**))

BI 314H. CELL AND MOLECULAR BIOLOGY (4). Fundamental concepts of prokaryotic and eukaryotic cell biology. Emphasizes cell structure and function at the molecular level. Lec/rec. **PREREQS:** ((BI 211 or BI 211H) and (BI 212 or BI 212H) and (BI 213 or BI 213H) and (CH 331* or CH 334**)) and Honors College approval required.

BI 315. *MOLECULAR BIOLOGY LABORATORY (3). Laboratory experiments will introduce students to basic molecular biological techniques, such as restriction analysis of DNA, introduction of recombinant plasmids into bacteria, expression of foreign genes in bacteria, polymerase chain reaction and protein analysis. Lec/lab. (Writing Intensive Course) **PREREQS:**

Concurrent or prior registration in (BI 314 or BI 314H) or BB 331.

BI 317. ^SCIENTIFIC THEORY AND PRACTICE (3). Teaches students the practice of biological science. Topics cover scientific theory, communications, and critical evaluation. **CROSSLISTED** as BB 317. (Writing Intensive Course) **PREREQS:** One year of college biology.

BI 349. *BIODIVERSITY: CAUSES, CONSEQUENCES AND CONSERVATION (3). The earth's biodiversity is a precious inheritance that is threatened by an unprecedented extinction crisis. This course examines the evolutionary and ecological processes that have created this unique diversity of life, the importance of biodiversity in maintaining the earth's ecosystems, and methods used to conserve biodiversity for future generations. **CROSSLISTED** as Z 349. (Bacc Core Course)

BI 350. ANIMAL BEHAVIOR (3). Concepts of behavior; sensory receptors, internal mechanisms, governing responses; learning and habituation; social organization and communication. **CROSSLISTED** as Z 350. **PREREQS:** BI 211 and BI 212 and BI 213

BI 358. SYMBIOSES AND THE ENVIRONMENT (3). Overview of the diversity of mutualistic symbioses and their roles in the natural environment. Integrative approach, from ecosystem to molecule, to the examination of certain key mutualisms. Lec. Offered alternate years. **PREREQS:** BI 211 and BI 212 and BI 213 and (CH 123 or (CH 233 or CH 233H) and (CH 263 or CH 263H))

BI 370. ECOLOGY (3). The study of interactions between organisms and their biotic and abiotic environments at the population, community, ecosystem, and biosphere levels of organization. **PREREQS:** BI 211 and BI 212 and BI 213

BI 371. ^ECOLOGICAL METHODS (3). Experimental design, data collection, analysis and synthesis in ecological studies; local ecosystems emphasized. May have field trip fee. Lec/lab. (Writing Intensive Course) **PREREQS:** (BI 370 or BI 370H)

BI 385. ^EMERGING INFECTIOUS DISEASES AND EPIDEMICS (3). Emerging and reemerging infectious disease is a contemporary global issue of great concern. To understand and evaluate the issue, the course covers germ theory, disease history and ecology, microbial pathogenesis and the immune response, historic plagues, and the biological, environmental, population and social changes that contribute to disease emergence. (Writing Intensive Course) **CROSSLISTED** as MB 385 **PREREQS:** BI 211 and BI 212 and BI 213

BI 388. ^SPECIAL TOPICS IN BIOLOGY (3). Studies of contemporary subjects of interest and importance in biology. (Writing Intensive Course) This course is repeatable for a maximum of 15 credits. **PREREQS:** One year of college biology or departmental approval required.

BI 399. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Requirements vary. Consult with department.

BI 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

BI 401H. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

BI 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

BI 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

BI 405H. READING AND CONFERENCE (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

BI 407. SEMINAR (1).

Departmental seminar. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

BI 407H. SEMINAR (1).

Departmental seminar. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required. Honors College approval required.

BI 410. INTERNSHIP (1-16).

Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

BI 420. *VIRUSES IN MODERN SOCIETY (3).

Impact of viruses on modern civilization. Molecular mechanisms of viral infectivity. Approaches to the prevention and cure of viral diseases. Role of viruses in agriculture and industry. Offered alternate years. (Bacc Core Course) **PREREQS:** (BI 311 or BI 314 or BI 314H)

BI 421. AQUATIC BIOLOGICAL INVASIONS (4).

An overview of the background, theory, evolution, ecology, politics and conservation of invasions by introduced species in aquatic environments. Taught at Hatfield Marine Science Center. **CROSSLISTED** as FW 421. **PREREQS:** One year of university-level biology.

BI 435. *GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK (3).

A multidisciplinary course that examines the scientific, social, political, economic, environmental, and ethical controversies surrounding agricultural and natural resource biotechnologies. Lec/lab/rec. **CROSSLISTED** as FES 435/FES 535, MCB 535, TOX 435/TOC 535. (Bacc Core Course)

BI 435H. *GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK (3).

A multidisciplinary course that examines the scientific, social, political, economic, environmental, and ethical controversies surrounding agricultural and natural resource biotechnologies. Lec/lab/rec. **CROSSLISTED** as FES 435/FES 535, MCB 535, TOX 435/TOC 535. (Bacc Core Course) **PREREQS:** Honors College approval required.

BI 445. EVOLUTION (3). Formal analysis of genetic and ecological mechanisms producing evolutionary change; special topics include speciation, ecological constraints, adaptive radiations, paleontology, biogeography, the origin of life, molecular evolution, and human evolution. **PREREQS:** BI 311

BI 450. ^MARINE BIOLOGY (16).

A comprehensive lecture and laboratory introduction to the flora and fauna of the marine environment approached from the level of the organism to ecosystem. Ecological patterns and processes characteristic of marine communities will be emphasized. Taught at Hatfield Marine Science Center, Newport, OR. (Writing Intensive Course) **PREREQS:** BI 370 or equivalent. Departmental approval required. Admission to BI 450 is by application in fall of the academic year students plan to attend.

BI 460. CELL BIOLOGY (3).

In-depth study of eukaryotic cells with emphasis on relationships between structural components and functional processes within and between cells. Topics include nuclear and cytoplasmic compartments, organization and assembly of the cytoskeleton, and abnormal cell development. **PREREQS:** BB 350* or (BB 450* and BB 451*) and BI 211 and BI 212 and BI 213 and /or an equivalent one year introductory biology sequence.

BI 461. CELL BIOLOGY LABORATORY (2).

Laboratory experiments to study the structure and functions of eukaryotic cells. **PREREQS:** BI 460*

BI 499. SPECIAL TOPICS/SENIOR BIOLOGY MAJOR FIELD TEST (0).

A comprehensive, two-hour test to assess the biological knowledge of seniors in the Biology Program. A pass will be given to all students who complete the exam. Contact the Biology Program Office in 3029 Cordley Hall for more information. **PREREQS:** Biology majors with senior standing. Summer graduates register their final spring term. All other students register their final OSU term.

BI 499H. SPECIAL TOPICS (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

BI 501. RESEARCH AND SCHOLARSHIP (1-16).

This course is repeatable for a maximum of 16 credits.

BI 503. THESIS/DISSERTATION (1-16).

This course is repeatable for a maximum of 999 credits.

BI 505. READING AND CONFERENCE (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

BI 535. GENES AND CHEMICALS IN AGRICULTURE: VALUE AND RISK (3).

A multidisciplinary course that examines the scientific, social, political, economic, environmental, and ethical controversies surrounding agricultural and natural resource biotechnologies. Lec/lab/rec. **CROSSLISTED** as FES 435/FES 535, MCB 535, TOX 435/TOX 535.

BI 545. EVOLUTION (3).

Formal analysis of genetic and ecological mechanisms producing evolutionary change; special topics include speciation, ecological constraints, adaptive radiations, paleontology, biogeography, the origin of life, molecular evolution, and human evolution. **PREREQS:** BI 311 or equivalent genetics course.

BI 560. CELL BIOLOGY (3).

In-depth study of eukaryotic cells with emphasis on relationships between structural components and functional processes within and between cells. Topics include nuclear and cytoplasmic compartments, organization and assembly of the cytoskeleton, and abnormal cell development. **PREREQS:** (BI 211, BI 212, BI 213) or an equivalent one year introductory biology sequence. BB 350* or (BB 450* and BB 451*)

BI 570. COMMUNITY STRUCTURE AND ANALYSIS (4).

Quantitative methods for the analysis of biotic communities, including community concepts, estimation of community composition parameters, theoretical aspects of multivariate methods of analyzing species-importance data, and overview of multivariate tools; hands-on computer analysis of data sets. Lec/lab. **PREREQS:** BI 370 and (ST 412 or ST 512) and calculus or equivalent.

BI 599. SPECIAL TOPICS (1-16).

This course is repeatable for a maximum of 16 credits.

BI 601. RESEARCH AND SCHOLARSHIP (1-16).

This course is repeatable for a maximum of 16 credits.

BI 670. COMMUNITY STRUCTURE AND ANALYSIS (4).

Quantitative methods for the analysis of biotic communities, including community concepts, estimation of community composition parameters, theoretical aspects of multivariate methods of analyzing species-abundance data, and overview of multivariate tools; hands-on computer analysis of data sets. Lec/lab. **PREREQS:** BI 370 and (ST 412 or ST 512) or equivalent and calculus.

BI 808. WORKSHOP (1-16).

This course is repeatable for a maximum of 16 credits.

■ MICROBIOLOGY COURSES**MB 110. ORIENTATION TO MICROBIOLOGY (1).**

Introduction of incoming microbiology students to college life with an emphasis on faculties, facilities,

services, and curricula in microbiology. Exposure to career opportunities in microbiology. Graded P/N.

MB 230. *INTRODUCTORY MICROBIOLOGY (4).

Microbiology as it affects our everyday lives. The impact of microorganisms on health, food/water sanitation, environment, industry, and genetic engineering. Lec/lab. (Bacc Core Course)

MB 230H. *INTRODUCTORY MICROBIOLOGY (4).

Microbiology as it affects our everyday lives. The impact of microorganisms on health, food/water sanitation, environment, industry, and genetic engineering. Lec/lab. (Bacc Core Course) **PREREQS:** Honors College approval required.

MB 299. SPECIAL TOPICS (1-16).

May be repeated for credit when topic varies. This course is repeatable for a maximum of 16 credits.

MB 299H. SPECIAL TOPICS (1-16).

May be repeated for credit when topic varies. This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

MB 302. GENERAL MICROBIOLOGY (3).

Emphasis on cytology, physiology, virology, growth and control of growth with coverage of the role of microorganisms in nature, in disease, and as useful tools. **PREREQS:** (CH 332 or CH 335) and (BI 212 or BI 212H) and (BI 213 or BI 213H)

MB 303. GENERAL MICROBIOLOGY LABORATORY (2).

Development of laboratory techniques; exercises designed to reinforce concepts covered in MB 302. MB 302 is a prereq that may be taken prior to or concurrently with MB 303. Lec/lab. **PREREQS:** MB 302* and two terms organic chemistry.

MB 310. BACTERIAL MOLECULAR GENETICS (3).

Introductory concepts of bacterial molecular genetics. Topics include DNA replication, mutation, DNA repair, DNA recombination, transposons, bacteriophages, genetic manipulation, and gene regulation. **PREREQS:** MB 302 and (BI 314 or BI 314H) and (BB 450 or BB 490) and (BB 451* or BB 491*)

MB 311. ^MOLECULAR MICROBIOLOGY LAB: A WRITING INTENSIVE COURSE (3).

Scientific writing, laboratory notebook composition, experimental design, and laboratory experiments in bacterial molecular biology. (Writing Intensive Course) **PREREQS:** ((MB 303 or MB 303H) and MB 310*)

MB 312. BACTERIAL PHYSIOLOGY AND METABOLISM (3).

Molecular structure and function, macromolecular assembly, energy production and use, and cellular growth. **PREREQS:** (MB 310 and BB 451) and BB 450

MB 330. *DISEASE AND SOCIETY (3).

Infectious disease has many effects on the development of society, and likewise, human interactions affect the development of disease. The course examines these interactions with a focus on the role of race, class, and economic status in the development of epidemics. (Bacc Core Course)

MB 385. ^EMERGING INFECTIOUS DISEASES AND EPIDEMICS (3).

Emerging and reemerging infectious disease is a contemporary global issue of great concern. To understand and evaluate the issue, the course covers germ theory, disease history and ecology, microbial pathogenesis and the immune response, historic plagues, and the biological, environmental, population and social changes that contribute to disease emergence. (Writing Intensive Course) **CROSSLISTED** as BI 385 **PREREQS:** BI 211 and BI 212 and BI 213

MB 399. SPECIAL TOPICS (1-16).

This course is repeatable for a maximum of 16 credits.

MB 399H. SPECIAL TOPICS (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

MB 401. RESEARCH (1-16).

This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MB 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MB 405. READING AND CONFERENCE (1-16). Conference: Instruction in microbiology. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MB 406. SPECIAL PROJECTS (1-16). Reading and Conference/Instructor in Microbiology. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MB 407. SEMINAR (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

MB 410. OCCUPATIONAL INTERNSHIP (1-10). Supervised work experience at selected cooperating institutions, agencies, laboratories, clinics or companies. Maximum of 10 credits allowed but no more than 3 credits may be used to satisfy microbiology major requirement of 36 credits. Graded P/N. This course is repeatable for a maximum of 10 credits. **PREREQS:** Departmental approval required.

MB 416. IMMUNOLOGY (3). Basic theory and applications of immunochemistry, immunogenetics, and cellular immunology. Examination of immunologically related diseases. **PREREQS:** (BB 450 or BB 490)

MB 417. IMMUNOLOGY LABORATORY (2). Laboratory on the applications of current immunological techniques. **PREREQS:** ((MB 303 or MB 303H) and MB 416*) and MB 310

MB 420. MICROBIAL GENOMES, BIOGEOCHEMISTRY, AND DIVERSITY (3). A survey of microbial diversity from the earliest lifeforms to the modern role of bacteria and archaea in global biogeochemical cycles. Topics covered include molecular evolution, microbial genomics, biochemical diversity, and metabolic pathways that adapt cells to extreme environments. Particular emphasis is placed on marine systems, from photosynthesis in surface waters to life in the ocean crust. **PREREQS:** BB 451

MB 430. BACTERIAL PATHOGENESIS (3). Bacteria pathogenic for humans, emphasizing the structural, physiological and genetic mechanisms of pathogenesis. Role of the immune system in pathogenesis and protection. **PREREQS:** MB 302 and MB 310 and (BB 451 or BB 491)

MB 434. VIROLOGY (3). Properties of viruses, their biology and pathogenesis. Emphasis on viruses causing human disease. **PREREQS:** (BB 451 and MB 310*)

MB 435. PATHOGENIC MICROBES LABORATORY (2). Laboratory experiments to illustrate concepts presented in MB 430 and/or MB 434, focusing on pathogenic microorganisms. **PREREQS:** ((MB 303 or MB 303H) and MB 302 and (MB 430* or MB 434))

MB 440. FOOD MICROBIOLOGY (3). Role of microorganisms in food spoilage, infection, and intoxication; also basic principles in contamination control and germicidal treatment during processing, preparing, and distributing food for consumption. **PREREQS:** MB 302 and / or equivalent.

MB 441. FOOD MICROBIOLOGY LABORATORY (2). Laboratory techniques to accompany MB 440/MB 540. **PREREQS:** ((MB 303 or MB 303H) and MB 440*) and MB 302

MB 448. MICROBIAL ECOLOGY (3). A comparison of soil sediments and freshwater as microbial habitats. Discussion of the role of microorganisms in nutrient cycles, effects of microbial activity on plant and animal life. **PREREQS:** MB 302

MB 456. MICROBIAL GENETICS AND BIOTECHNOLOGY (3). General biology of natural, genetically engineered, and composite plasmids. Major topics include extrachromosomal

DNA replication, plasmid transmission, insertion elements, transposons, gene expression, and recombinant DNA vectors. Biotechnological applications and molecular genetic tools are emphasized. **PREREQS:** ((BB 351 or BB 451) and (BB 350 or BB 450) and MB 302 and MB 310*)

MB 479. FERMENTATION MICROBIOLOGY (3). An introduction to industrial microbiology with a focus on the physiology of fermentation and use of microorganisms for the production of food ingredients, fermented foods, and beverages. FST students need to take BB 350 and MB students need to take BB 450 for their respective majors. **CROSSLISTED** as FST 479/FST 579. **PREREQS:** ((BB 350 or BB 450) and MB 302)

MB 480. GENERAL PARASITOLOGY (3). Introduction to parasitology. The course emphasizes medical parasitology, but will cover a broad overview of parasitology, covering important groups and host/parasite relationships among all taxa from invertebrates to vertebrates, including mammals. **PREREQS:** BI 314 or BB 450 or equivalent or Z 361 or MB 302 or equivalent.

MB 490. MICROBIOLOGY CAPSTONE EXPERIENCE (2). Capstone experience for microbiology students to practice professional skills necessary to sustain a career in science. Students will work in teams to analyze research data and communicate this analysis, in addition to explore career opportunities and learn how to successfully compete for jobs. Graded P/N. **PREREQS:** MB 302 and junior or senior status.

MB 491. FISH DISEASES IN CONSERVATION BIOLOGY AND AQUACULTURE (4). Introduction to diseases of fish including pathogens important to aquaculture and ornamental industries as well as to wild fish populations and conservation programs. Lec/lab. **CROSSLISTED** as FW 491/ FW 591. **PREREQS:** 9 credits of upper-division fisheries or biology.

MB 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

MB 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

MB 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

MB 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MB 507. SEMINAR (1). Graded P/N. This course is repeatable for a maximum of 99 credits.

MB 510. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MB 511. SCIENTIFIC SKILLS (1). Foundational skills for success in graduate school. Students will also become familiar with ongoing research programs in three active programs in the Microbiology Program.

MB 512. HIGHLIGHTS OF MICROBIOLOGY (1). Designed for students to gain familiarity with the history of microbiology through reading, reviewing and writing about great papers in the field. Students also meet the Microbiology Program faculty and students, and learn about some of the research in the Microbiology Program through attending colloquium.

MB 513. MICROBIAL SYSTEMS (3). Presentation of a modern view of microbiology through the lens of microbes' influences on our planet's habitats and inhabitants. Discusses current research and the use of advanced techniques to illustrate how microbiology is contributing to many cross-disciplinary problems that can involve engineering, public health, sociology, ecology, geology, etc.

MB 516. IMMUNOLOGY (3). Basic theory and applications of immunochemistry, immunogenetics, and cellular immunology.

Examination of immunologically related diseases. **PREREQS:** BB 450 or BB 490

MB 517. IMMUNOLOGY LABORATORY (2). Laboratory on the applications of current immunological techniques. **PREREQS:** MB 303 and MB 310. Concurrent enrollment in MB 516.

MB 520. MICROBIAL GENOMES, BIOGEOCHEMISTRY, AND DIVERSITY (3). A survey of microbial diversity from the earliest lifeforms to the modern role of bacteria and archaea in global biogeochemical cycles. Topics covered include molecular evolution, microbial genomics, biochemical diversity, and metabolic pathways that adapt cells to extreme environments. Particular emphasis is placed on marine systems, from photosynthesis in surface waters to life in the ocean crust. **PREREQS:** BB 451 or BB 551

MB 530. BACTERIAL PATHOGENESIS (3). Bacteria pathogenic for humans, emphasizing the structural, physiological and genetic mechanisms of pathogenesis. Role of the immune system in pathogenesis and protection. **PREREQS:** MB 302 and MB 310 and (BB 451 or BB 491)

MB 534. VIROLOGY (3). Properties of viruses, their biology and pathogenesis. Emphasis on viruses causing human disease. **PREREQS:** MB 310 and BB 451

MB 540. FOOD MICROBIOLOGY (3). Role of microorganisms in food spoilage, infection, and intoxication; also basic principles in contamination control and germicidal treatment during processing, preparing, and distributing food for consumption. **PREREQS:** MB 302 or equivalent.

MB 541. FOOD MICROBIOLOGY LABORATORY (2). Laboratory techniques to accompany MB 440/MB 540. **PREREQS:** MB 540* and MB 302 and MB 303

MB 548. MICROBIAL ECOLOGY (3). A comparison of soil sediments and freshwater as microbial habitats. Discussion of the role of microorganisms in nutrient cycles, effects of microbial activity on plant and animal life. **PREREQS:** MB 302

MB 555. BIOLOGY OF THE PROKARYOTES (3). An integrative graduate course examining bacterial and archaeal life at different levels of biological organization, emphasizing current research and analysis of primary literature. The various life styles of prokaryotes are the common theme of the course. Topics include biofilms, cooperation and communication, development, stress responses, metabolic interactions involved in global nutrient cycling. Offered every even year in winter term. **PREREQS:** BB 450 and MB 310 and MB 312 or equivalent

MB 556. MICROBIAL GENETICS AND BIOTECHNOLOGY (3). General biology of natural, genetically engineered, and composite plasmids. Major topics include extrachromosomal DNA replication, plasmid transmission, insertion elements, transposons, gene expression, and recombinant DNA vectors. Relevance to Biotechnological applications and molecular genetic tools are emphasized. **PREREQS:** (BB 350 or BB 450) and (BB 314 or BB 451) and MB 302 MB 310*

MB 579. FERMENTATION MICROBIOLOGY (3). An introduction to industrial microbiology with a focus on the physiology of fermentation and use of microorganisms for the production of food ingredients, fermented foods, and beverages. **CROSSLISTED** as FST 479/FST 579. **PREREQS:** (BB 350 or BI 314) and MB 302

MB 580. GENERAL PARASITOLOGY (3). Introduction to parasitology. The course emphasizes medical parasitology, but will cover a broad overview of parasitology, covering important groups and host/parasite relationships among all taxa from invertebrates to vertebrates, including mammals. **PREREQS:** BI 314 or BB 450 or equivalent or Z 361 or MB 302 or equivalent.

MB 591. FISH DISEASES IN CONSERVATION BIOLOGY AND AQUACULTURE (4). Introduction to diseases of fish including pathogens important to aquaculture and ornamental industries as well as to wild fish populations and conservation programs. Lec/lab. **CROSSLISTED** as FW 491/ FW 591. **PREREQS:** 9 credits of upper-division fisheries or biology.

MB 599. SELECTED TOPICS (1-6). This course is repeatable for a maximum of 24 credits.

MB 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MB 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

MB 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MB 607. SEMINAR (1). Graded P/N. This course is repeatable for a maximum of 99 credits.

MB 610. INTERNSHIP (1-9). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

MB 668. MICROBIAL BIOINFORMATICS AND GENOME EVOLUTION (4). Theoretical and practical issues in microbial genome sequencing and annotation, with an emphasis on evolutionary theory and comparative analysis of microbial genome sequences. Metabolic prediction from genomes, with a population genetics perspective on comparative microbial genomics. Exploration of applications of genomics and allied tools to microbial populations, including metagenomics, metaproteomics, and metatranscriptomics.

MB 699. SPECIAL TOPICS (1-16). Lec/lab. This course is repeatable for a maximum of 16 credits.

■ ZOOLOGY COURSES

Z 315. DINOSAUR BIOLOGY (3). In-depth examination of our current understanding of dinosaur systematics, physiology, and ecology. Possible factors associated with dinosaur extinction (i.e., natural catastrophes, global climate change, diseases, etc.) will also be covered. Lec. **PREREQS:** Sophomore standing.

Z 331. HUMAN ANATOMY AND PHYSIOLOGY (3). Lecture course on structure and functions of the human body. Tissues, organ systems, homeostatic mechanisms, patho-physiology and pathomorphology. **PREREQS:** Z 331 is a prerequisite for Z 332 and Z 333.

Z 332. HUMAN ANATOMY AND PHYSIOLOGY (3). Lecture course on structure and functions of the human body. Tissues, organ systems, homeostatic mechanisms, patho-physiology and pathomorphology. **PREREQS:** Z 331

Z 333. HUMAN ANATOMY AND PHYSIOLOGY (3). Lecture course on structure and functions of the human body. Tissues, organ systems, homeostatic mechanisms, patho-physiology and pathomorphology. **PREREQS:** Z 332

Z 341. HUMAN ANATOMY AND PHYSIOLOGY LABORATORY (2). Dissection of preserved specimens and study of prepared human prosection materials. Physiology demonstrations illustrate functions of organ systems. F-skeletal muscular; W-neural; S-gastric, vascular, renal. Lab fee. Lab. **PREREQS:** Concurrent enrollment in Z 331

Z 342. HUMAN ANATOMY AND PHYSIOLOGY LABORATORY (2). Dissection of preserved specimens and study of prepared human prosection materials. Physiology demonstrations illustrate functions of organ systems. F-skeletal muscular; W-neural; S-gastric, vascular, renal. Lab fee. Lab. **PREREQS:** Concurrent enrollment in Z 332

Z 343. HUMAN ANATOMY AND PHYSIOLOGY LABORATORY (2). Dissection of preserved specimens and study of prepared human prosection materials. Physiology demonstrations illustrate functions of organ systems. F-skeletal muscular; W-neural; S-gastric, vascular, renal. Lab fee. Lab. **PREREQS:** Concurrent enrollment in Z 333

Z 345. *INTRODUCTION TO EVOLUTION (3). Elements of evolutionary theory; origin and history of life; evolutionary controversy; origins of species, sex, and humans. Lec. (Bacc Core Course)

Z 348. *HUMAN ECOLOGY (3). The impact of humans on the environment, emphasizing the political, sociological, and ecological consequences of human population growth. Topics of current critical importance will include global warming trends, destruction of the ozone layer, consequences of pollution, habitat destruction, the loss of biodiversity, and conservation biology. Lec. (Bacc Core Course)

Z 349. *BIODIVERSITY: CAUSES, CONSEQUENCES, AND CONSERVATION (3). The earth's biodiversity is a precious inheritance that is threatened by an unprecedented extinction crisis. This course examines the evolutionary and ecological processes that have created this unique diversity of life, the importance of biodiversity in maintaining the earth's ecosystems, and methods used to conserve biodiversity for future generations. **CROSSLISTED** as BI 349. (Bacc Core Course)

Z 350. ANIMAL BEHAVIOR (3). Concepts of behavior; sensory receptors, internal mechanisms governing responses; learning and habituation; social organization and communication. **CROSSLISTED** as BI 211 and BI 212 and BI 213

Z 351. MARINE ECOLOGY (3). Ecological interactions and principles in different marine habitats. Topics include the organisms (plants, invertebrates, vertebrates) found in major habitats and interactions between organisms. Habitats discussed include coral reefs, rocky shores, kelp forests, near-shore waters, open-ocean waters, and the deep sea. Emphasis is placed on how organism-organism interactions produce varying patterns of distribution, abundance, body size, diversity, stability, and succession. Lec. **PREREQS:** One year of biology. Z 351 may be taken alone or concurrently with Z 352.

Z 352. MARINE ECOLOGY LABORATORY (2). Laboratory and field exposure to many of the organisms and processes discussed in Z 351. Research projects provide students with the opportunity to experience the process by which information about marine ecology is obtained. Field trip fee. Lab fee. Lec/lab. **PREREQS:** Z 351*

Z 361. INVERTEBRATE BIOLOGY (3). Phylogeny of invertebrates; structure, function, life histories, evolution of aquatic and terrestrial species. Interdependence of form, ecology, physiology and behavior. Lec. **PREREQS:** ((BI 211 or BI 211H) and (BI 212 or BI 212H) and (BI 213 or BI 213H))

Z 362. INVERTEBRATE BIOLOGY LABORATORY (2). Morphology and anatomy of representative invertebrates introduced in Z 361; diversity within phyla. Study is by dissections and both microscopic and macroscopic examination; field trip fee. Lab fee. Lec/lab. **PREREQS:** ((BI 211 or BI 211H) and (BI 212 or BI 212H) and (BI 213 or BI 213H) and Z 361*)

Z 365. BIOLOGY OF INSECTS (4). Introduction to the study of insects, stressing the biological attributes responsible for the success and dominance of insects. Emphasis on taxonomy, morphology, behavior, ecology, and coevolutionary interrelationships. Lec/lab.

Z 371. VERTEBRATE BIOLOGY (3). Overview of vertebrate origins and phylogeny, structural and functional adaptations, behavior, and ecology. Lec. **PREREQS:** BI 211 and BI 212 and BI 213 and

may be taken alone or concurrently with Z 372.

Z 372. VERTEBRATE BIOLOGY LABORATORY (2). Classification, identification, and natural history of vertebrates. Includes laboratory examination of specimens and frequent field trips (fee charged) emphasizing Oregon fauna. Lab fee. **PREREQS:** BI 211 and BI 212 and BI 213 and Z 371*

Z 401. RESEARCH (1-16). Undergraduate research completed under faculty supervision. This course is repeatable for a maximum of 99 credits. **PREREQS:** Departmental approval required.

Z 403. THESIS (1-16). Undergraduate thesis, completed under faculty supervision. Required of honors students. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

Z 405. READING AND CONFERENCE (1-16). For undergraduates, to be arranged with individual faculty. Readings and discussions on topics of mutual interest. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

Z 407. SEMINAR (1-16). Undergraduate enrichment seminars, as offered by faculty. Graded P/N. This course is repeatable for a maximum of 16 credits.

Z 407H. SEMINAR (1-16). Undergraduate enrichment seminars, as offered by faculty. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

Z 410. OCCUPATIONAL INTERNSHIP (1-16). Practical experience working with professionals. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

Z 422. COMPARATIVE ANATOMY (5). Descriptive, experimental and historical approach to the study of evolution and anatomy of all organ systems of vertebrates. Laboratory emphasizes vertebrate developmental anatomy. Lec/lab. **PREREQS:** BI 211 and BI 212 and BI 213

Z 423. ENVIRONMENTAL PHYSIOLOGY (4). Comparative environmental physiology of vertebrates with emphasis on adaptations to such aspects of the physical environment as temperature, water, ions, and gases. Consideration given to interactions between physiology and environment that influence the local and geographic distribution of animals. Lec/rec. **PREREQS:** BI 211 and BI 212 and BI 213

Z 425. EMBRYOLOGY AND DEVELOPMENT (5). An integrated molecular, cellular and whole organism approach. Sequential embryonic events from gametogenesis through organogenesis. Discussion of experiments into mechanisms of these events; cellular interactions, pattern formation, regulation of gene expression, and cellular differentiation. Lab emphasizes descriptive vertebrate embryology with introduction to experimental methods. Lab fee. Lec/lab. **PREREQS:** BI 311 and (BI 314 or BI 314H) and Three years of biology.

Z 427. PALEOBIOLOGY (3). Considers those aspects of the fossil record of potential use to life scientists, including the following topics: community history, biogeographic history, rates of evolution (taxonomic, phyletic, cladogenetic, behavioral, quantum), species problem as viewed with fossils, coevolution, overall history of life, speciation mechanisms. Lec. **PREREQS:** BI 211 and BI 212 and BI 213

Z 430. PRINCIPLES OF PHYSIOLOGY (4). Concepts and mechanisms of physiology, especially membrane physiology, muscle function, sensory mechanisms, neural integration. First in the Z43X series, although courses may be taken in any order. Lec/rec. **PREREQS:** BI 211 and BI 212 and BI 213 and CH 332*

Z 431. VERTEBRATE PHYSIOLOGY (4).

Systems/concepts covered include the autonomic nervous system, digestion/metabolism, renal and osmoregulatory, endocrine and reproductive systems. Second in Z43X series, although courses may be taken in any order. Lec/rec. **PREREQS:** BI 211 and BI 212 and BI 213 and CH 332*

Z 432. VERTEBRATE PHYSIOLOGY (4).

Systems/concepts covered include blood, immune, lymphatic, cardiovascular, and pulmonary. Third in the Z43X series, although courses may be taken in any order. Lec/rec. **PREREQS:** BI 211 and BI 212 and BI 213 and CH 332*

Z 437. VERTEBRATE ENDOCRINOLOGY (4).

An exploration of vertebrate endocrinology that examines principles of hormone action, inter- and intracellular signaling mechanisms within endocrine axes, and comparative endocrine physiology, emphasizing concepts of homeostasis and methodologies for evaluating normal and pathological function. Students are provided multiple forums for class participation, in the form of scientific presentations and «mini-reports.» **PREREQS:** BI 314 or BI 314H and BI 314

Z 440. INSECT PHYSIOLOGY (3).

Fundamentals of insect physiology from the behavioral to the molecular level. Cellular physiology and hormonal control of molting, metamorphosis and reproduction. Overview of body functions: respiration, circulation, digestion, metabolism, and osmoregulation. Physiological basis of behavior: muscles and flight, structure and functions of the nervous system, sensory physiology and chemical communication. During the course the contributions of insect physiology to (1) an understanding of general physiological principles and (2) biorational methods of insect pest control are discussed. **PREREQS:** ENT 311 and (BI 211 or BI 211H or BI 213 or BI 213H) or instructor approval required.

Z 441. ADVANCED HUMAN ANATOMY AND PHYSIOLOGY LABORATORY (2).

Dissection of preserved specimens and study of prepared human prosection materials. Functions illustrated by physiology exercises. Organ systems emphasized: F-skeleto-muscular; W-neural; S-gastric, vascular, renal. Lab write-ups required. Lab fee. Lec/lab. **PREREQS:** Concurrent enrollment in Z 430 and Z 431 or Z 432.

Z 442. ADVANCED HUMAN ANATOMY AND PHYSIOLOGY LABORATORY (2).

Dissection of preserved specimens and study of prepared human prosection materials. Functions illustrated by physiology exercises. Organ systems emphasized: F-skeleto-muscular; W-neural; S-gastric, vascular, renal. Lab write-ups required. Lab fee. Lec/lab. **PREREQS:** Concurrent enrollment in Z 430 and Z 431 or Z 432

Z 443. ADVANCED HUMAN ANATOMY AND PHYSIOLOGY LABORATORY (2).

Dissection of preserved specimens and study of prepared human prosection materials. Functions illustrated by physiology exercises. Organ systems emphasized: F-skeleto-muscular; W-neural; S-gastric, vascular, renal. Lab write-ups required. Lab fee. Lec/lab. **PREREQS:** Concurrent enrollment in Z 430 and Z 431 or Z 432

Z 451. FUNCTIONAL ANATOMY OF THE HUMAN MUSCULAR SYSTEM (4).

In-depth dissection of the orientation, innervation, and functional significance of muscles and muscle groups. Topics include muscle identification, joint anatomy and variation of human form. Z 551 student expectations include vascularization and detailed joint anatomy. The laboratory component will consist of the dissection of the muscular anatomy of a human cadaver. Lab fee. Lec/lab. **PREREQS:** Z 331 and Z 332 and Z 333 and Z 341 and Z 342 and Z 343 and department approval required. Admission to Z 451/Z 551 is by application in spring of the academic year students plan to attend.

Z 453. ^SCIENTIFIC WRITING AND BEHAVIORAL OBSERVATIONS (3).

Students will be introduced to the writing style of scientific research papers in the context of reporting on behavioral observations. Lec/lab. (Writing Intensive Course)

Z 461. MARINE AND ESTUARINE INVERTEBRATE ZOOLOGY (4).

Comparative survey of eight major invertebrate phyla and many lesser-known phyla. Areas of emphasis will be 1) invertebrate identification, 2) natural history (diversity, habitat, feeding, behavior), and 3) comparative anatomy (adaptive significance of morphological structures). Laboratories and field trips will strongly supplement lecture material. Lec/lab. Taught at Hatfield Marine Science Center. **PREREQS:** BI 211 and BI 212 and BI 213

Z 464. MARINE CONSERVATION BIOLOGY (3).

Lectures, group library research, and class debates on current issues regarding the conservation of biodiversity in the sea. Topics include overfishing, invasive species, eutrophication, marine pollution, and global warming, as well as means of addressing these threats. **CROSSLISTED** as FW 464/FW 564. **PREREQS:** (BI 370 or BI 370H) and / or equivalent. Seniors, postbacs, and graduate students only.

Z 473. HERPETOLOGY (3).

World families and distribution of amphibians and non-avian sauroptods; evolution, population biology, life histories, current literature. **PREREQS:** (BI 211 or BI 211H) and (BI 212 or BI 212H) and (BI 213 or BI 213H)

Z 474. SYSTEMATIC HERPETOLOGY (2).

A survey of the phylogenetic diversity of amphibians and reptiles of the United States. Identification through the use of keys will be stressed. Field trip fee. Lab fee. Lec/lab. **PREREQS:** One year of introductory biology and/or vertebrate biology.

Z 477. AQUATIC ENTOMOLOGY (4).

Biology, ecology, collection, and identification of aquatic insects. Not offered every year. **PREREQS:** Upper-division standing.

Z 481. BIOGEOGRAPHY (3).

Covers the principles on which biogeography is based, past and present, plus a historical account of changing biogeography from the past to the present. Marine and nonmarine aspects are dealt with, involving what is known concerning both plants and animals. Offered alternate years. **PREREQS:** Instructor approval required.

Z 495. DISEASE ECOLOGY (3).

An introduction to disease ecology—the study of disease processes in natural populations and communities. The course focuses on (I) the role parasites play in the ecology and evolution of animal populations, including humans; and (II) the relevance of ecological and evolutionary considerations in managing infectious diseases. **PREREQS:** BI 370

Z 499. SPECIAL TOPICS (1-16).

Topics and credits vary. Grading mode TBA. This course is repeatable for a maximum of 16 credits.

Z 499H. SPECIAL TOPICS (1-16).

Topics and credits vary. Grading mode TBA. This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

Z 501. RESEARCH (1-16).

Graduate-level research completed under faculty supervision. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

Z 503. THESIS (1-16).

Master's thesis, completed under faculty supervision. This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

Z 505. READING AND CONFERENCE (1-16).

For graduate students working toward a master's degree. After arrangements with individual faculty, readings and discussions on topics of mutual interest. This course is repeatable for a maximum

of 16 credits. **PREREQS:** Departmental approval required.

Z 507. SEMINAR (1). Graded P/N. This course is repeatable for a maximum of 16 credits.

Z 510. INTERNSHIP (1-16). This course is repeatable for a maximum of 16 credits.

PREREQS: Departmental approval required.

Z 522. COMPARATIVE ANATOMY (5).

Descriptive, experimental and historical approach to the study of evolution and anatomy of all organ systems of vertebrates. Laboratory emphasizes vertebrate developmental anatomy. Lec/lab. **PREREQS:** Graduate or postbac standing.

Z 523. ENVIRONMENTAL PHYSIOLOGY (4).

Comparative environmental physiology of vertebrates with emphasis on adaptations to such aspects of the physical environment as temperature, water, ions, and gases. Consideration given to interactions between physiology and environment that influence the local and geographic distribution of animals. Lec/rec. **PREREQS:** Graduate or postbac standing.

Z 525. EMBRYOLOGY AND DEVELOPMENT (5).

An integrated molecular, cellular and whole organism approach. Sequential embryonic events from gametogenesis through organogenesis. Discussion of experiments into mechanisms of these events; cellular interactions, pattern formation, regulation of gene expression, and cellular differentiation. Lab emphasizes descriptive vertebrate embryology with introduction to experimental methods. Lab fee. Lec/lab. **PREREQS:** Graduate or postbac standing.

Z 527. PALEOBIOLOGY (3).

Considers those aspects of the fossil record of potential use to life scientists, including the following topics: community history, biogeographic history, rates of evolution (taxonomic, phyletic, cladogenetic, behavioral, quantum), species problem as viewed with fossils, coevolution, overall history of life, speciation mechanisms. Lec. **PREREQS:** One year of biology and upper-division standing.

Z 530. PRINCIPLES OF PHYSIOLOGY (4).

Concepts and mechanisms of physiology, especially membrane physiology, muscle function, sensory mechanisms, neural integration. First in the Z43X series, although courses may be taken in any order. Lec/rec. **PREREQS:** (BI 211 or BI 211H) and (BI 212 or BI 212H) and (BI 213 or BI 213H) and CH 332*

Z 531. VERTEBRATE PHYSIOLOGY (4).

Systems/concepts covered include the autonomic nervous system, digestion/metabolism, renal and osmoregulatory, endocrine and reproductive systems. Second in Z43X series, although courses may be taken in any order. Lec/rec. **PREREQS:** (BI 211 or BI 211H) and (BI 212 or BI 212H) and (BI 213 or BI 213H) and CH 332*

Z 532. VERTEBRATE PHYSIOLOGY (4).

Systems/concepts covered include blood, immune, lymphatic, cardiovascular, and pulmonary. Third in the Z43X series, although courses may be taken in any order. Lec/rec. **PREREQS:** (BI 211 or BI 211H) and (BI 212 or BI 212H) and (BI 213 or BI 213H) and CH 332*

Z 537. VERTEBRATE ENDOCRINOLOGY (4).

An exploration of vertebrate endocrinology that examines principles of hormone action, inter- and intracellular signaling mechanisms within endocrine axes, and comparative endocrine physiology, emphasizing concepts of homeostasis and methodologies for evaluating normal and pathophysiological function. Students are provided multiple forums for class participation, in the form of scientific presentations and «mini-reports.» **PREREQS:** (BI 314 or BI 314H) and graduate status or instructor approval required.

Z 540. INSECT PHYSIOLOGY (3).

Fundamentals of insect physiology from the behavioral to the molecular level. Cellular physiology and hormonal control of molting, metamorphosis and reproduction. Overview of body functions:

respiration, circulation, digestion, metabolism, and osmoregulation. Physiological basis of behavior: muscles and flight, structure and functions of the nervous system, sensory physiology and chemical communication. During the course the contributions of insect physiology to (1) an understanding of general physiological principles and (2) biorational methods of insect pest control are discussed. **PREREQS:** Graduate standing.

Z 551. FUNCTIONAL ANATOMY OF THE HUMAN MUSCULAR SYSTEM (4). In-depth dissection of the orientation, innervation, and functional significance of muscles and muscle groups. Topics include muscle identification, joint anatomy and variation of human form. Z 551 student expectations include vascularization and detailed joint anatomy. The laboratory component will consist of the dissection of the muscular anatomy of a human cadaver. Lab fee. Lec/lab. **PREREQS:** Z 331 and Z 332 and Z 333 and Z 341 and Z 342 and Z 343 and department approval required. Admission to Z 451/Z 551 is by application in spring of the academic year students plan to attend.

Z 556. PHYLOGENETICS (4). Explores the theory and practice of modern phylogenetic analysis. Emphasis placed on tree reconstruction algorithms, assessment of statistical support, and contemporary issues in phylogenetics. Lab will focus on the use of phylogenetic software and the analysis of molecular data sets. Lec/lab. **CROSSLISTED** as BOT 556. **PREREQS:** ST 511

Z 561. MARINE AND ESTUARINE INVERTEBRATE ZOOLOGY (4). Comparative survey of eight major invertebrate phyla and many lesser-known phyla. Areas of emphasis will be 1) invertebrate identification, 2) natural history (diversity, habitat, feeding, behavior), and 3) comparative anatomy (adaptive significance of morphological structures). Laboratories and field trips will strongly supplement lecture material. Lec/lab. Taught at Hatfield Marine Science Center. **PREREQS:** Graduate standing.

Z 564. MARINE CONSERVATION BIOLOGY (3). Lectures, group library research, and class debates on current issues regarding the conservation of biodiversity in the sea. Topics include overfishing, invasive species, eutrophication, marine pollution, and global warming, as well as means of addressing these threats. **CROSSLISTED** as FW 464/FW 564. **PREREQS:** BI 370 or BI 370H or equivalent. Seniors, postbacs, and graduate students only.

Z 565. MARINE CONSERVATION SCIENCE AND POLICY (3). Introduces the science-policy interface of ocean resource management. Through discussions, lectures, and independent projects, students will learn how policy is formulated at the state and federal levels, and the role of science in that process. Emphasizes current topics, such as ecosystem-based management. Graded P/N. Taught at Hatfield Marine Science Center. **PREREQS:** Graduate standing.

Z 573. HERPETOLOGY (3). World families and distribution of amphibians and non-avian sauropods; evolution, population biology, life histories, current literature. **PREREQS:** Graduate or postbac standing.

Z 574. SYSTEMATIC HERPETOLOGY (2). A survey of the phylogenetic diversity of amphibians and reptiles of the United States. Identification through the use of keys will be stressed. Field trip fee. Lab fee. Lec/lab. **PREREQS:** Graduate or postbac standing.

Z 577. AQUATIC ENTOMOLOGY (4). Biology, ecology, collection, and identification of aquatic insects. Not offered every year. **PREREQS:** Graduate or postbac standing.

Z 581. BIOGEOGRAPHY (3). Covers the principles on which biogeography is based, past and present, plus a historical account of changing biogeography from the past to the present. Marine and nonmarine aspects are dealt with, involving what is known concerning both plants and animals. Offered alternate years. **PREREQS:** Graduate or postbac standing.

Z 585. GRANT WRITING AND ETHICS (3). Participants will write and submit a grant proposal by the end of the term. We discuss the main components of a typical grant proposal. Participants read and critique proposal drafts written by participants in the workshop. Ethical issues are discussed as they are encountered. Graded P/N. This course is repeatable for a maximum of 6 credits.

Z 587. SCIENTIFIC WRITING AND ETHICS (3). Participants will write a scientific paper based on their own research and submit it for publication. Topics to be covered include writing skills (e.g., making a good argument, choice of a journal, reviewing the literature) and ethical issues (e.g., citation, plagiarism, disclosure, data archiving, and acknowledgment). This course is repeatable for a maximum of 6 credits. **PREREQS:** Graduate standing.

Z 593. BEHAVIORAL ECOLOGY (5). Behavioral ecology with emphasis on both theoretical and empirical approaches. Offered alternate years. **PREREQS:** Graduate or postbac standing.

Z 594. COMMUNITY ECOLOGY (5). Theory and analysis of multispecies associations. Emphasis on extent to which existing ecological theory is supported by natural phenomena. Course considers how biotic and abiotic mechanisms interact to regulate community organization and stability in marine, freshwater, and terrestrial habitats. Offered alternate years. **PREREQS:** Graduate or postbac standing.

Z 595. DISEASE ECOLOGY (3). An introduction to disease ecology--the study of disease processes in natural populations and communities. The course focuses on (I) the role parasites play in the ecology and evolution of animal populations, including humans; and (II) the relevance of ecological and evolutionary considerations in managing infectious diseases. **PREREQS:** Graduate standing.

Z 599. SPECIAL TOPICS (1-16). Topics and credits vary. Grading mode TBA. Taught at Hatfield Marine Science Center and Corvallis campus. This course is repeatable for a maximum of 16 credits.

Z 601. RESEARCH (1-16). Doctoral-level research under faculty supervision. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval.

Z 603. THESIS (1-16). Doctoral thesis completed under faculty supervision. This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval.

Z 605. READING AND CONFERENCE (1-16). For graduate students working toward doctoral degree. After arrangements with individual faculty, readings and discussions on topics of mutual interest. This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval.

STATISTICS**Virginia M. Lesser, Chair**44 Kidder Hall
Oregon State University
Corvallis, OR 97331-4606
541-737-3584Email: stat-statoff@science.oregonstate.edu
Website: http://www.stat.oregonstate.edu/**FACULTY****Professor** Lesser**Associate Professors** Gitelman,
Madsen, Murtaugh, Xue**Assistant Professors** Di, Emerson,
Fuentes, Jiang, Sharpton, Wickham**Research Associate** Pereira**Senior Instructor** Kollath**Instructor** Jager, Moore**Undergraduate Minor****Statistics****Graduate Major****Statistics (MA, MAg, MAIS, MS, PhD)****Graduate Area of Concentration**
*Statistics***Graduate Minor****Statistics**

The Department of Statistics offers undergraduate service courses and an undergraduate minor, as well as graduate courses and programs leading to the MA, MS, and PhD degrees or to a minor for an advanced degree in other fields. Students planning to major in statistics at the graduate level should have a minimum of mathematics through multivariable calculus, linear algebra, and an upper-division sequence in mathematical statistics.

STATISTICS MINOR

The undergraduate minor in Statistics requires a minimum of 27 credits in statistics, including:

*ST 201. Principles of Statistics (4)

or ST 314. Introduction to Statistics for Engineers (3)

or ST 351. Introduction to Statistical Methods (4)

ST 352. Introduction to Statistical Methods (4)

ST 407. Seminar: Sect. 1 Attendance at Consulting Practicum (1)

ST 421, ST 422. Introduction to Mathematical Statistics (4,4)

and at least 10 credits of additional approved courses.

Approved courses include:

BOT 440. Field Methods in Plant Ecology (4)

ECE 461. Introduction to Analog and Digital Communications (4)

ECON 424. Introduction to Econometrics (4)

FOR 321. Forest Mensuration (5)

H 425. Foundations of Epidemiology (3)

IE 355. Statistical Quality Control (4)

IE 356. Experimental Design for Industrial Processes (4)

MTH 464. Probability II (3)

MTH 465. Probability III (3)

MTH 467. Actuarial Mathematics (3)

PSY 301. Research Methods in Psychology (4)

SOC 315. ^Methods I: Research Design (4)

ST 411, ST 412, ST 413. Methods of Data Analysis (4,4,4)

ST 415. Design and Analysis of Planned Experiments (3)

ST 431. Sampling Methods (3)

ST 435. Quantitative Ecology (3)

ST 439. Survey Methods (3)

ST 441. Probability, Computing, and Simulation in Statistics (4)

ST 443. Applied Stochastic Models (3)

ST 473. Ecological Sampling (3)

ST 499. Special Topics (1–4)

Other statistics-related courses may be substituted, subject to departmental approval.

*** ST 314 or ST 351 may be taken in place of ST 201.****Footnotes:**

* Baccalaureate Core Course

^ Writing Intensive Course (WIC)

STATISTICS (MA, MAg, MS, PhD, MAIS)**Graduate Areas of Concentration**
Statistics

The Department of Statistics offers Master of Arts, Master of Science, and Doctor of Philosophy degrees in Statistics. Students can concentrate on theory or applications, and programs can be tailored to emphasize such areas of interest as ecology, engineering, forestry, finance, mathematics, or oceanography. The thesis is optional for MS and MA degrees. Statistical consulting is part of the program, enabling the student to gain a deeper appreciation of the need, power, and applicability of statistical tools through exposure to real problems.

MS in Statistics

The MS program is designed to prepare a candidate for a career in industry or government or for further study at the PhD level. Recent MS graduates have found employment with the U.S. Environmental Protection Agency, U.S. Census Bureau, Abt Associates, state of Oregon, Fred Hutchinson Cancer Research Center, Kaiser Permanente, Mayo Clinic, Bureau of Labor Statistics, Department of Veteran's Affairs, NOAA, MRI Global, and Capital One.

Prerequisites

- Single-variable and multivariable calculus (approximately 4 quarters).
- Linear algebra.
- An undergraduate sequence in mathematical statistics. Typical textbook: *Mathematical Statistics with Applications* by Mendenhall, et al.
- One or more applied statistics courses

(recommended, but not required).

Students who meet all of the requirements except for one or two courses may be granted provisional admission so they can begin their graduate studies while completing the remaining required courses. When the remedial course work is completed the Graduate School will remove the provisional status.

Required

ST 501. Research (3)

ST 506. Projects: (Sect 2) Teaching Experience (1)

ST 507. Seminar: (Sect 1) Attendance at Consulting Seminar (1)

ST 507. Seminar: (Sect 3) Attendance at Research Seminar (1,1)

ST 509. Consulting Practicum (2)

ST 541. Probability, Computing, and Simulation in Statistics (4)

ST 551, ST 552, ST 553. Statistical Methods (4,4,4)

ST 561, ST 562, ST 563. Theory of Statistics (3,3,3)

ST 623. Generalized Regression Models I (3) Additional approved courses* (15)

Total=52 credits

* Approved courses include all 500- and 600-level courses in the Statistics Department except:

ST 511, ST 512, ST 513. Methods of Data Analysis (4,4,4)

ST 515. Design and Analysis of Planned Experiments (3)

ST 521, ST 522. Introduction to Mathematical Statistics (4,4)

Courses with a zero middle digit and courses in other departments may be used only with the consent of the major professor (and minor professor if the course is listed in the minor).

A student intending to pursue the PhD in Statistics should review the mathematics prerequisites and requirements for that program and plan a course of study to satisfy them.

Other Requirements

- Pass written comprehensive exams in statistical methods and in statistical theory. These exams are given each year in September.
- Pass a final oral exam.

PhD in Statistics

The PhD program is designed to prepare a candidate for a career in teaching and research. Recent PhD graduates have found employment with US Geological Survey, Chase Bank, Bureau of Labor Statistics, USDA Forest Service, Weyerhaeuser, as well as with universities in the U.S. and abroad.

Prerequisites

- Equivalent to the OSU Master's degree in Statistics.
- Pass the MS comprehensive exams in methods and theory.
- Apply for admission to PhD program. (Evaluation is by the entire faculty. The evaluation criteria for

admission are: course work, grades, MS comprehensive exam results, and any information you provide in your application giving evidence of capability to do original research.)

- Course work equivalent to MTH 311, Advanced Calculus (4) and MTH 312, Advanced Calculus (4).

Required Course Work

MTH 511. Real Analysis (3)
 MTH 664. Probability Theory (3)
 ST 509. Consulting (2 credits annually)
 ST 541. Probability, Computing, and Simulation in Statistics (4)
 ST 551, ST 552, ST 553. Statistical Methods (3,3,3)
 ST 561, ST 562, ST 563. Theory of Statistics (3,3,3)
 ST 603. Thesis: PhD Research (36 credit minimum)
 ST 623, ST 525. Generalized Regression Models I, II (3,3)
 ST 651, ST 652. Linear Model Theory (3,3)
 ST 661, ST 662, ST 663. Advanced Theory of Statistics (3,3)

Total of about 120 credits of course work.

Credits completed for an MS degree as well as the 36 or more credits of ST 603 count toward this total. The specific courses to be taken are decided at a meeting of the PhD committee.

Other Requirements:

- Pass the preliminary exam over PhD course work.
- Write a thesis describing the results of original research.
- Pass the final examination over thesis and related material.

STATISTICS GRADUATE MINOR

MS Minor in Statistics

Required

ST 521, ST 522. Introduction to Mathematical Statistics (4,4)
 ST 511, ST 512. Methods of Data Analysis (4,4)

The student and/or minor professor may wish to add one or two additional courses from below:

ST 513. Methods of Data Analysis (4)
 ST 515. Design and Analysis of Planned Experiments (3)
 ST 531. Sampling Methods (3)
 ST 535. Quantitative Ecology (3)
 ST 557. Applied Multivariate Analysis (3)
 ST 565. Time Series (3)
 ST 573. Ecological Sampling (3)

PhD Minor in Statistics

A PhD minor program in statistics should include:

ST 521, ST 522. Introduction to Mathematical Statistics (4,4)
 or ST 561, ST 562, ST 563. Theory of Statistics (3,3,3)
 ST 551, ST 552, ST 553. Statistical Methods (4,4,4)
 or ST 511, ST 512, ST 513. Methods of Data Analysis (4,4,4)

Additional statistics-related courses approved by the minor professor.

- If ST 551, ST 552, and ST 553 are taken, the additional courses should total at least 3 credits.
- If ST 511, ST 512, and ST 513 are taken, they should total at least 6 credits.

All programs must be approved by the student's minor professor.

COURSES

ST 201. PRINCIPLES OF STATISTICS (4). Study design, descriptive statistics, the use of probability in statistical arguments, sampling, hypothesis tests and confidence intervals for means and proportions. Lec/rec. **PREREQS:** High school algebra. ST 201 and ST 202 must be taken in order.

ST 202. PRINCIPLES OF STATISTICS (4). Comparisons of means and proportions between two populations (t-tests, chi-square tests, nonparametric tests), simple linear regression, correlation. Lec/rec. **PREREQS:** ST 201

ST 314. INTRODUCTION TO STATISTICS FOR ENGINEERS (3). Probability, common probability distributions, sampling distributions, estimation, hypothesis testing, control charts, regression analysis, experimental design. **PREREQS:** (MTH 252 or MTH 252H)

ST 314H. INTRODUCTION TO STATISTICS FOR ENGINEERS (3). Probability, common probability distributions, sampling distributions, estimation, hypothesis testing, control charts, regression analysis, experimental design. **PREREQS:** (MTH 252 or MTH 252H) and Honors College approval required.

ST 351. INTRODUCTION TO STATISTICAL METHODS (4). Study designs, descriptive statistics, collecting and recording data, probability distributions, sampling distributions for means and proportions, hypothesis testing and confidence intervals for means and proportions in one- and two-sample inference, and chi-square tests. Lec/lab. **PREREQS:** High school algebra with statistics. ST 351 and ST 352 must be taken in order.

ST 351H. INTRODUCTION TO STATISTICAL METHODS (4). Study designs, descriptive statistics, collecting and recording data, probability distributions, sampling distributions for means and proportions, hypothesis testing and confidence intervals for means and proportions in one- and two-sample inference, and chi-square tests. **PREREQS:** High school algebra with statistics. ST 351 and ST 352 must be taken in order. Honors College approval required.

ST 352. INTRODUCTION TO STATISTICAL METHODS (4). Randomization tests and other nonparametric tests for one- and two-sample inference, simple and multiple linear regression, correlation, one- and two-way analysis of variance, logistic regression. Lec/lab. **PREREQS:** (ST 351 or ST 351H) and ST 351 and ST 352 must be taken in order.

ST 406. PROJECTS (1-16). Section 1: Projects, graded P/N. Section 2: Teaching Experience, graded P/N. Section 3: Directed Work, graded P/N. This course is repeatable for a maximum of 16 credits.

ST 407. SEMINAR (1). Attendance at consulting practicum. Graded P/N.

ST 410. INTERNSHIP (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

ST 411. METHODS OF DATA ANALYSIS (4). Graphical, parametric and nonparametric methods for comparing two samples; one-way and two-way analysis of variance; simple linear regression. Lec/lab. **PREREQS:** ST 209 or ST 351 or the equivalent. ST 411, ST 412 and ST 413 must be taken in order.

ST 412. METHODS OF DATA ANALYSIS (4). Multiple linear regression, including model checking, dummy variables, using regression to fit analysis of variance models, analysis of covariance, variable selection methods. Lec/lab. **PREREQS:** ST 411 and ST 209 or ST 351 or the equivalent.

ST 413. METHODS OF DATA ANALYSIS (4). Principles of experimental design; randomized block and factorial designs; repeated measures; categorical data analysis, including comparison of proportions, tests of homogeneity and independence in cross-classified frequency tables, Mantel-Haenszel test, logistic regression, log-linear regression. Introduction to multivariate statistics. Lec/lab. **PREREQS:** ST 412 and ST 351 or the equivalent.

ST 415. DESIGN AND ANALYSIS OF PLANNED EXPERIMENTS (3). Principles of experimental design; uses, construction and analysis of completely randomized, randomized block and Latin square designs; covariates; factorial treatments, split plotting; random effects and variance components. **PREREQS:** (ST 352 or ST 411 or ST 511)

ST 421. INTRODUCTION TO MATHEMATICAL STATISTICS (4). Probability, random variables, expectation, discrete and continuous distributions, multivariate distributions. **PREREQS:** MTH 253. ST 421 and ST 422 must be taken in order.

ST 422. INTRODUCTION TO MATHEMATICAL STATISTICS (4). Sampling distributions, Central Limit Theorem, estimation, confidence intervals, properties of estimators, and hypothesis testing. **PREREQS:** ST 421 and MTH 253

ST 431. SAMPLING METHODS (3). Estimation of means, totals and proportions; sampling designs including simple random, stratified, cluster, systematic, multistage and double sampling; ratio and regression estimators; sources of errors in surveys; capture-recapture methods. **PREREQS:** ST 411 or ST 511

ST 435. QUANTITATIVE ECOLOGY (3). Overview of statistical methods that are useful for analyzing ecological data, including spatial pattern analysis, multivariate techniques, logistic regression, Bayesian statistics and computer-intensive methods. Consideration of special topics such as population dynamics, food webs and ecological indicators. Not offered every year. **PREREQS:** (ST 412 or ST 512)

ST 439. SURVEY METHODS (3). Survey design, sampling, data collection and analysis, general methodology. Not offered every year. **PREREQS:** (ST 201 or ST 351)

ST 441. PROBABILITY, COMPUTING, AND SIMULATION IN STATISTICS (4). Review of probability, including univariate distributions and limit theorems. Random-number generation and simulation of statistical distributions. Bootstrap estimates of standard error. Variance reduction techniques. Emphasis on the use of computation in statistics using the MATLAB programming language. Lec/lab. **PREREQS:** (ST 422 or ST 522)

ST 443. APPLIED STOCHASTIC MODELS (3). Development of stochastic models commonly arising in statistics and operations research, such as Poisson processes, birth-and-death processes, discrete-time and continuous-time Markov chains, renewal and Markov renewal processes. Analysis of stochastic models by simulation and other computational techniques. **PREREQS:** (ST 421 or ST 521) and experience with a high-level programming language or mathematical computation package.

ST 499. SPECIAL TOPICS (1-4). This course is repeatable for a maximum of 8 credits.

ST 501. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ST 503. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Departmental approval required.

ST 505. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Departmental approval required.

ST 506. PROJECTS (1-16). Section 1: Projects. Section 2: Teaching Experience. Section 3: Directed Work. This course is repeatable for a maximum of 16 credits.

ST 507. SEMINAR (1). Section 1: Attendance at consulting practicum, 1 credit. Section 3: Research Seminar, 1 credit. Section 4: Computing Facilities, 1 credit. All sections graded P/N. This course is repeatable for a maximum of 99 credits.

ST 509. CONSULTING PRACTICUM (2). The student provides statistical advice, under faculty guidance, on university-related research projects. This course is repeatable for a maximum of 99 credits. **PREREQS:** ST 507, section 1 and ST 553, or instructor approval required.

ST 510. INTERNSHIP (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

ST 511. METHODS OF DATA ANALYSIS (4). Graphical, parametric and nonparametric methods for comparing two samples; one-way and two-way analysis of variance; simple linear regression. Lec/lab. **PREREQS:** ST 209 or ST 351 or the equivalent. ST 511, ST 512, and ST 513 must be taken in order.

ST 512. METHODS OF DATA ANALYSIS (4). Multiple linear regression, including model checking, dummy variables, using regression to fit analysis of variance models, analysis of covariance, variable selection methods. Lec/lab. **PREREQS:** ST 511 and ST 209 or ST 351 or the equivalent.

ST 513. METHODS OF DATA ANALYSIS (4). Principles of experimental design; randomized block and factorial designs; repeated measures; categorical data analysis, including comparison of proportions, tests of homogeneity and independence in cross-classified frequency tables, Mantel-Haenszel test, logistic regression, log-linear regression. Introduction to multivariate statistics. Lec/lab. **PREREQS:** ST 512 and ST 351 or the equivalent.

ST 515. DESIGN AND ANALYSIS OF PLANNED EXPERIMENTS (3). Principles of experimental design; uses, construction and analysis of completely randomized, randomized block and Latin square designs; covariates; factorial treatments, split plotting; random effects and variance components. **PREREQS:** ST 352 or (ST 411 or ST 511)

ST 521. INTRODUCTION TO MATHEMATICAL STATISTICS (4). Probability, random variables, expectation, discrete and continuous distributions, multivariate distributions. **PREREQS:** MTH 253. ST 521 and ST 522 must be taken in order.

ST 522. INTRODUCTION TO MATHEMATICAL STATISTICS (4). Sampling distributions, Central Limit Theorem, estimation, confidence intervals, properties of estimators, and hypothesis testing. **PREREQS:** ST 521 and MTH 253

ST 531. SAMPLING METHODS (3). Estimation of means, totals and proportions; sampling designs including simple random, stratified, cluster, systematic, multistage and double sampling; ratio and regression estimators; sources of errors in surveys; capture-recapture methods. **PREREQS:** ST 411 or ST 511

ST 535. QUANTITATIVE ECOLOGY (3). Overview of statistical methods that are useful for analyzing ecological data, including spatial pattern analysis, multivariate techniques, logistic regression, Bayesian statistics and computer-intensive methods. Consideration of special topics such as population dynamics, food webs and ecological indicators. Not offered every year. **PREREQS:** ST 412 or ST 512

ST 539. SURVEY METHODS (3). Survey design, sampling, data collection and analysis, general methodology. Not offered every year. **PREREQS:** ST 201 or ST 351

ST 541. PROBABILITY, COMPUTING, AND SIMULATION IN STATISTICS (4). Review of probability, including univariate distributions and limit theorems. Random-number generation and simulation of statistical distributions. Bootstrap estimates of standard error. Variance reduction techniques. Emphasis on the use of computation in statistics using the S-Plus or MATLAB programming language. Lec/lab. **PREREQS:** ST 422 or ST 522

ST 543. APPLIED STOCHASTIC MODELS (3). Development of stochastic models commonly arising in statistics and operations research, such as Poisson processes, birth-and-death processes, discrete-time and continuous-time Markov chains, renewal and Markov renewal processes. Analysis of stochastic models by simulation and other computational techniques. **PREREQS:** (ST 421 or ST 521) and experience with a high-level programming language or mathematical computation package.

ST 551. STATISTICAL METHODS (4). Properties of t , chi-square and F tests; randomized experiments; sampling distributions and standard errors of estimators, delta method, comparison of several groups of measurements; two-way tables of measurements. **PREREQS:** ST 422 or ST 522. Should concurrently enroll in MTH 341. ST 551, ST 552 and ST 553 must be taken in order.

ST 552. STATISTICAL METHODS (4). Simple and multiple linear regression including polynomial regression, indicator variables, weighted regression, and influence statistics, nonlinear regression and linear models for binary data. **PREREQS:** ST 551 and ST 422 or ST 522. Concurrent enrollment in MTH 341.

ST 553. STATISTICAL METHODS (4). Principles and analysis of designed experiments, including factorial experiments, analysis of covariance, random and mixed effect models. Lec/lab. **PREREQS:** ST 552 and concurrent enrollment in MTH 341.

ST 555. ADVANCED EXPERIMENTAL DESIGN (3). Designs leading to mixed models including split plots, repeated measures, crossovers and incomplete blocks. Introduction to experimental design in industry including confounding, fractional factorials and response surface methodology. Analysis of unbalanced data. **PREREQS:** ST 553

ST 557. APPLIED MULTIVARIATE ANALYSIS (3). Multivariate data structures, linear combinations; principal components, factor and latent structure analysis, canonical correlations, discriminant analysis; cluster analysis, multidimensional scaling. Not offered every year. **PREREQS:** (ST 412 or ST 512) and (MTH 252 or MTH 245)

ST 559. BAYESIAN STATISTICS (3). Bayesian statistics for data analysis. Characterizations of probability; comparative (Bayesian versus frequentist) inference; prior, posterior and predictive distributions; hierarchical modeling. Computational methods include Markov Chain Monte Carlo for posterior simulation. **PREREQS:** ST 562

ST 561. THEORY OF STATISTICS (3). Distributions of functions of random variables, joint and conditional distributions, sampling distributions, convergence concepts, order statistics. **PREREQS:** (ST 422 or ST 522), ST 561, ST 562, and ST 563 must be taken in order.

ST 562. THEORY OF STATISTICS (3). Sufficiency, exponential families, location and scale families; point estimation: maximum likelihood, Bayes, and unbiased estimators; asymptotic distributions of maximum likelihood estimators; Taylor series approximations. **PREREQS:** ST 561 and ST 422 or ST 522

ST 563. THEORY OF STATISTICS (3). Hypothesis testing: likelihood ratio, Bayesian, and uniformly most powerful tests; similar tests in exponential families; asymptotic distributions of likelihood ratio test statistics; confidence intervals. **PREREQS:** ST 562 and ST 422 or ST 522

ST 565. TIME SERIES (3). Analysis of serially correlated data in both time and frequency domains. Autocorrelation and partial autocorrelation functions, autoregressive integrated moving average models, model building, forecasting; filtering, smoothing, spectral analysis, frequency response studies. Offered winter term in even years. **PREREQS:** (ST 412 or ST 512) and (ST 422 or ST 522)

ST 567. SPATIAL STATISTICS (3). The analysis of spatial data. Graphical tools for exploring spatial data, geostatistics, variogram estimation, kriging, areal models, hierarchical spatial models, and spatio-temporal modelling. Offered winter term in odd years. **PREREQS:** (ST 412 or ST 512) and (ST 422 or ST 522)

ST 573. ECOLOGICAL SAMPLING (3). Sampling of animal populations, frameless sampling, detectability, line transects, circular plots, mark-recapture, line intercept sampling; spatial sampling, quadrats, kriging; adaptive sampling designs. Not offered every year. **PREREQS:** (ST 412 or ST 512) and (ST 421 or ST 521)

ST 599. SPECIAL TOPICS (1-4). May be repeated for credit when topic varies. This course is repeatable for a maximum of 16 credits.

ST 601. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Instructor approval required.

ST 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits. **PREREQS:** Instructor approval required.

ST 606. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

ST 623. GENERALIZED REGRESSION MODELS I (3). Maximum likelihood analysis for frequency data; regression-type models for binomial and Poisson data; iterative weighted least squares and maximum likelihood; analysis of deviance and residuals; overdispersion and quasi-likelihood models; log-linear models for multidimensional contingency tables. **PREREQS:** (ST 553 and ST 563)

ST 625. GENERALIZED REGRESSION MODELS II (3). Parametric methods for the analysis of censored survival data, based mostly on large-sample likelihood theory. Specific topics include the Kaplan-Meier estimator, the log-rank test, partial likelihood, and regression models, including the Cox proportional-hazards model and its generalizations. **PREREQS:** (ST 553 or ST 563)

ST 651. LINEAR MODEL THEORY (3). Least squares estimation, best linear unbiased estimation, parameterizations, multivariate normal distributions, distributions of quadratic forms, testing linear hypotheses, simultaneous confidence intervals. Offered alternate years. **PREREQS:** ST 553 and ST 563. ST 651 and ST 652 must be taken in order.

ST 652. LINEAR MODEL THEORY (3). Advanced topics including classification models, mixed-effects models and multivariate models. Offered alternate years. **PREREQS:** ST 651 and ST 553 and ST 563

ST 661. ADVANCED THEORY OF STATISTICS (3). Exponential families, sufficient statistics; unbiased, equivariant, Bayes, and admissible estimation. Offered alternate years. **PREREQS:** ST 563 and MTH 511. ST 661, ST 662, and ST 663 must be taken in order.

ST 662. ADVANCED THEORY OF STATISTICS (3). Uniformly most powerful, unbiased, similar, and invariant tests. Offered alternate years. **PREREQS:** ST 661 and ST 563 and MTH 511

ST 663. ADVANCED THEORY OF STATISTICS (3). First-order and higher-order asymptotics; likelihood ratio, score, and Wald tests; Edgeworth and saddlepoint approximations. Offered alternate years. **PREREQS:** ST 662 and ST 563 and MTH 511

Students who complete the requirements of the University Honors College (UHC) receive OSU's most prestigious academic recognition for undergraduates: an honors baccalaureate degree (HBA, HBFA or HBS) in their major, jointly awarded by the University Honors College and the college of their major.

The University Honors College is about enrichment: How high can you dream? The UHC provides challenging curricula, personal attention, and enhanced learning experiences in general education and in the student's primary academic interest. The University Honors College offers courses consisting of small groups taught by OSU's finest faculty, specifically selected for their undergraduate teaching abilities. Through seminars, colloquia, and their own thesis research, students enjoy the benefits of a small college within a large, diverse, and comprehensive university.

Both a four-year and a two-year track are available. The two-year track is designed for transfer students or for students already enrolled at OSU. Interested students should contact the University Honors College for information.

The University Honors College, in cooperation with University Housing and Dining Services, maintains an Honors living-learning community, West Residence Hall.

Undergraduate Degrees

Honors Bachelor of Arts (HBA)

Honors Bachelor of Fine Arts (HBFA)

Honors Bachelor of Science (HBS)

MAJORS AND DEGREES

Students enrolled in the University Honors College can pursue any one of OSU's wide range of undergraduate majors. Students who complete the requirements of the University Honors College receive OSU's most prestigious undergraduate academic recognition: an honors baccalaureate degree in their major, jointly awarded by the Honors College and the college in which their major is located.

ADMISSION

Admission is competitive and selective—only a small percentage of all entering students join the University Honors College and space is limited. UHC students are exceptionally able, highly motivated, and intellectually curious. They have a highly developed social consciousness and a sense of responsibility. Admission decisions are based on grade-point averages, SAT or ACT scores, and responses to an essay question that reveal the student's ability to think deeply and creatively. High school applicants must have a minimum of 3.75 GPA or a score of 1820 SAT, 27 ACT to be considered for admission.

Entering first-year students interested in beginning the UHC fall term should submit an application by either November 1 or February 1. UHC applicants must also apply for admission to OSU by that time. Admission decisions are made approximately 45 days after the submission deadlines. Responses to current year UHC essay questions are required.

Transfer or advanced-standing applicants should submit an application by March 15th and will be notified no later than April 30th. Personal visits are encouraged.

DEGREE REQUIREMENTS

The honors degree is jointly awarded by the University Honors College and by the college of the student's major. Therefore, additional credit requirements beyond the total required by the college of the student's major must be completed. UHC students must satisfy all university and major requirements, as well as Honors requirements. A student who completes a 30-credit track of University Honors College courses will be designated an Honors Scholar. A student who completes a 15-credit track will be designated as an Honors Associate. In either instance successful completion leads to receipt of an honors baccalaureate degree. Transcripts will also reflect Honors College completion and will denote UHC course work.

Many honors classes satisfy dual requirements; please check details with an Honors College advisor. For students in majors that require a senior thesis project, the honors thesis requirements may complement those majors.

RETENTION CRITERIA

All UHC students must maintain a 3.25 cumulative OSU GPA and make timely progress toward fulfilling the requirements of the UHC and their major. All UHC student grades will be reviewed each term. Students below, or at risk of falling below the specified 3.25 cumulative OSU GPA, will be notified to come in for advising. Students whose cumulative GPA remains below the standard will be removed from the college.

All students must maintain contact with Honors College advisors through regularly scheduled appointments.

HONORS COURSES

See the Schedule of Classes each term under Honors College (HC) and under departmental listings for courses with an H suffix. The UHC publishes its own schedule, which is available each term in the UHC office and on the UHC website. Honors courses change annually; many are offered under departmental designators.

See the UHC website for additional information, <http://honors.oregonstate.edu>.

HONORS ASSOCIATE (HBA, HBFA, HBS)

The honors degree is jointly awarded by the University Honors College and by the college of the student's major. Therefore additional credit requirements beyond the total required by the college of the student's major must be completed. UHC students must satisfy all university and major requirements, as well as Honors

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ADMINISTRATION

Toni Doolen,
Dean,
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toni.doolen@oregonstate.edu

requirements. A student who completes a 15-credit track will be designated as an Honors Associate. Successful completion leads to receipt of an honors baccalaureate degree. Transcripts will also reflect Honors College completion and will denote UHC course work. Interested students please contact the University Honors College at 541-737-6400 or email honors.college@oregonstate.edu.

The requirements for the Honors Associate track include:

- Honors colloquia (minimum 6 credits)
- Honors electives (minimum 6 credits)
- Thesis/Research/Projects (minimum 3 credits)
- At least 12 honors credits must be upper division.
- Bound thesis

HONORS SCHOLAR (HBA, HBFA, HBS)

The honors degree is jointly awarded by the University Honors College and by the college of the student's major. Therefore additional credit requirements beyond the total required by the college of the student's major must be completed. UHC students must satisfy all university and major requirements, as well as Honors requirements. A student who completes a 30-credit track of University Honors College courses will be designated an Honors Scholar. Successful completion leads to receipt of an honors baccalaureate degree. Transcripts will also reflect Honors College completion and will denote UHC course work. Interested students please contact the University Honors College at 541-737-6400 or email honors.college@oregonstate.edu.

The requirements for the Honors Scholar track include:

- Honors baccalaureate core courses (minimum 6 credits)
- Honors colloquia (minimum 6 credits)
- Honors electives (minimum 12 credits)
- Thesis/Research/Projects (minimum 6 credits)
- At least 12 honors credits must be upper division.
- Bound thesis

COURSES

HC 199. *HONORS WRITING (3). Through a range of assignments, texts, and guest speakers, Honors College students will develop critical thinking skills and a strategy for writing in their discipline. (Bacc Core Course) This course is repeatable for a maximum of 3 credits. **PREREQS:** WR 121 and Honors College approval required.

HC 299. SELECTED TOPICS (1-16). Selected topics for University Honors College students. This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

HC 399. SELECTED TOPICS (1-16). Upper-division special topics for University Honors College students. This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

HC 401. RESEARCH AND SCHOLARSHIP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

HC 402. INDEPENDENT STUDY (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

HC 403. THESIS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

HC 404. WRITING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

HC 405. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

HC 406. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

HC 407. SEMINAR (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

HC 408. WORKSHOP (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

HC 409. PRACTICUM (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

HC 499. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits. **PREREQS:** Honors College approval required.

The College of Veterinary Medicine at Oregon State University was established in 1975 with three major areas of responsibility—teaching, research, and public service. The college is fully accredited by the American Veterinary Medical Association's Council on Education.

Professional Program
Veterinary Medicine (DVM)

Graduate Major
Comparative Health Sciences (MS, PhD)

Graduate Minor
Comparative Health Sciences

TEACHING

The college was established in 1975 and began its professional education program in 1979. Approximately 40 residents of Oregon and 16 nonresident students are selected to enter the OSU College of Veterinary Medicine. These students will complete all four years of their professional education in Corvallis. Completion of the professional program leads to the Doctor of Veterinary Medicine (DVM) degree.

There are two departments supporting the DVM doctoral program: Biomedical Sciences and Clinical Sciences.

Comprehensive research training is provided through graduate programs leading to the MS degree in Comparative Health Sciences.

Post-DVM residency training leading to board eligibility in several clinical disciplines and pathology is also available.

RESEARCH

Biomedical research is conducted in the college, supported by federal agencies such as NIH, USDA, DOE, as well as by a number of foundations. Collaboration with the OSU Agricultural Experiment Station, colleges of Pharmacy, Public Health and Human Sciences, Engineering and many other colleges, is part of the program. The research is of economic and public health significance, aimed at improving the health of animals and people.

The college emphasizes research of infectious diseases, such as those caused by *Mycobacteria*, *Chlamydia*, *Clostridia*, *Vibrio*, *Mycoplasma*, *Cryptosporidium*, herpesvirus, respiratory syncytial virus, influenza virus, and HIV-1 virus. Research is also conducted on immunity and nutrition, neuroscience, cancer, cardiovascular diseases, diabetes, reproductive diseases, and diseases of terrestrial and aquatic wildlife.

PUBLIC SERVICE

The service programs focus on the diagnosis, prevention, treatment, and control and prevention of animal diseases. The college assists veterinary practitioners, animal owners, and the general public through the Veterinary Diagnostic Laboratory and the Veterinary Teaching Hospital.

The Veterinary Diagnostic Laboratory is a full-service facility providing a wide

range of animal disease diagnostic testing services to veterinarians, animal owners, and public agencies. The laboratory offers testing and expertise in pathology, clinical pathology, bacteriology, and virology, and is accredited by the American Association of Veterinary Laboratory Diagnosticians.

The Veterinary Teaching Hospital is designed and equipped for diagnosis and medical and surgical treatment of canine, feline, equine, food animal, and camelid patients. Patients are admitted directly from animal owners and through referrals from practicing veterinarians in Oregon and the Pacific Northwest. Imaging (radiology, ultrasonography, fluoroscopy, CAT scan, MRI, and scintigraphy), anesthesiology, pharmacy, intensive care, and other services are available to support the hospital functions.

The Veterinary Diagnostic Laboratory and the Veterinary Teaching Hospital serve as learning centers where senior veterinary students and residents study animal disease, diagnosis, treatment, and prevention.

Providing continuing education for veterinarians is also considered a major responsibility of the college. One- to three-day intensive courses of instruction on specific topics are offered periodically.

**CAREER OPPORTUNITIES
IN VETERINARY MEDICINE**

Opportunities for employment in veterinary medicine are excellent. Nearly 70 percent of the professionally active veterinarians in the United States are engaged in private practice. Some practices are limited to types of animals, such as food animal, equine, or companion animal practices. Others involve specialties such as surgery, ophthalmology, cardiology, or radiology. In addition to private practice, there are numerous teaching and research opportunities in academic, government, and industrial settings. Expanding areas include laboratory animal medicine and public health.

**VETERINARY
STUDENT EXPENSES**

Oregon resident students registered in the College of Veterinary Medicine will pay tuition and fees of approximately \$7,106 per term. Students from the WICHE states will pay the same fees as Oregon resident students. Nonresident student fees currently are \$13,733 per term.

Veterinary students must provide required professional attire, as well as dissection, surgical, and diagnostic instruments, and notes and books.

Occasional field trips are scheduled in the veterinary curriculum. Transportation is provided by the university for required trips, but students must provide their own food and lodging. For optional trips, the student is usually expected to provide transportation, lodging, and food. All other expenses, such as residence hall and

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Website:
http://vetmed.
oregonstate.edu/

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living expenses, are the same as for students in other colleges of the university.

Students desiring additional information about veterinary medicine should write to the Office of the Dean, College of Veterinary Medicine, Oregon State University, 200 Magruder Hall, Corvallis, Oregon 97331-4801, or email cvmproginfo@oregonstate.edu or see our website at <http://oregonstate.edu/vetmed/>.

POLICY ON LABORATORY AND DUTY HOURS

During the professional curriculum, several laboratory exercises in the preclinical years require the use of live animals. The exercises are designed to complement didactic lectures and demonstrations through hands-on experience with various species of animals. In all instances, the animals are humanely treated and anesthetized if the procedures are potentially painful.

During the clinical years, animals are used in laboratory exercises in the teaching of basic surgical skills and medical procedures. In most instances, the animals are anesthetized. Strict protocol is enforced regarding the animals' well-being in exercises requiring post-operative recovery. All use of animals in teaching is approved by the university's Institutional Animal Care and Use committee.

During the fourth year of the veterinary curriculum, students complete rotations in sections of the Veterinary Teaching Hospital and Veterinary Diagnostic Laboratory. Emergency services are offered to the public on a 24-hour basis, seven days a week. Student assignments in the clinical blocks are demanding, and students are required to spend time at night, weekends, and holidays in the delivery of health care to patients. Hospital operations continue seven days per week, and students are responsible for their assigned tasks regardless of time and day of week.

VETERINARY MEDICINE (DVM)

Graduation Requirements

To be awarded the Doctor of Veterinary Medicine degree, candidates must have passed all required courses in the veterinary curriculum, have a minimum of a 2.00 grade-point average in the veterinary curriculum, satisfactorily complete a senior paper and a required veterinary procedures list.

Preveterinary Curriculum

Typical preveterinary curriculum at Oregon State University follows. Oregon State University courses that will meet the preveterinary academic requirements:

ANS 314. Animal Physiology (4)
 or Z 331. Human Anatomy and Physiology (3)
 BI 211, BI 212, BI 213. *Principles of Biology (4,4,4)

BB 450, BB 451. General Biochemistry (4,3)
 BI 311. Genetics (4)

or ANS 378. Animal Genetics (4)

CH 121, CH 122, CH 123. General Chemistry (5,5,5)

or CH 231, CH 232, CH 233. *General Chemistry (4,4,4)

and CH 261, CH 262, CH 263.

*Laboratory for Chemistry 231, 232, 233 (1,1,1)

CH 331, CH 332. Organic Chemistry (4,4)

MTH 111. *College Algebra (4)

and MTH 112. *Elementary Functions (4)

PH 201, PH 202. *General Physics (5,5)

ST 351. Introduction to Statistical Methods (4)

English Writing (6)

Humanities/Social Sciences (12)

Public Speaking (3)

Upper-Division Biological Sciences with Lab (6)

*Baccalaureate core courses

Professional Curriculum DVM Degree

First Year

Fall (18)

VMB 709. Veterinary Medicine Orientation (1)

VMB 711. Veterinary Gross Anatomy (4)

VMB 714. Veterinary Microscopic Anatomy (4)

VMB 717. Veterinary Physiology (5)

VMB 740. Veterinary Integrative Problem Solving (1)

VMC 738. Introduction to Animal Care (3)

Winter (17)

VMB 712. Veterinary Gross Anatomy (4)

VMB 715. Veterinary Microscopic Anatomy (3)

VMB 716. Veterinary Neurosciences (4)

VMB 718. Veterinary Physiology (5)

VMB 741. Veterinary Integrative Problem Solving (1)

Spring (21)

VMB 713. Veterinary Gross Anatomy (4)

VMB 719. Veterinary Physiology (4)

VMB 720. Veterinary Immunology (5)

VMB 721. Veterinary Pathology (5)

VMB 742. Veterinary Integrative Problem Solving (1)

VMC 720. Veterinary Clinical Nutrition (2)

Second Year

Fall (20 credits)

VMB 750. Systemic Pathology I (4)

VMB 753. Veterinary Virology (4)

VMB 759. Veterinary Bacteriology and Mycology (5)

VMB 760. Veterinary Parasitology (5)

VMB 761. Veterinary Pharmacology (2)

Winter (17 credits)

VMB 751. Systemic Pathology II (5)

VMB 762. Veterinary Pharmacology II (4)

VMB 763. Veterinary Clinical Pathology (4)

VMC 764. Diagnostic Imaging (4)

Spring (21 credits)

VMB 765. Veterinary Toxicology (4)

VMC 725. Principles of Surgery (4)

VMC 739. Veterinary Medical Ethics (1)

VMB 766. Veterinary Medicine and Public Health (3)

VMB 767. Veterinary Epidemiology (3)

VMC 768. Principles of Anesthesia (4)

VMC 769. General Medicine (2)

Third Year

Fall (21-24)

VMC 770. Large Animal Medicine I (4)

VMC 773. Medicine Laboratory I (1)

VMC 776. Small Animal Medicine I (5)

VMC 783. Theriogenology I (4)

VMC 785. Small Animal Surgery (7)

Electives (0-3)

Winter (19-22)

VMC 774. Medicine Laboratory II (1)

VMB 775. Practice Management (2)

VMC 724. Large Animal Surgery (6)

VMC 771. Large Animal Medicine II (4)

VMC 777. Small Animal Medicine II (5)

VMC 786. Animal Behavior (1)

Electives (0-3)

Spring (15-24)

VMB 728. Special Animal Medicine (4)

VMB 745. Communications for Veterinarians (1)

VMC 772. Large Animal Medicine III (4)

VMC 778. Small Animal Medicine III (5)

VMC 787. Third-Year Clinics (1)

Electives (0-9)

Fourth Year

Required Blocks

VMB 736. Diagnostic Clinical Pathology (2)

VMB 795. Diagnostic Services (2)

VMC 711. Clinical Cardiology (2)

VMC 712. Clinical Oncology (2)

VMC 732. Clinical Medicine I (6)

VMC 734. Clinical Surgery I (6)

VMC 735. Rural Veterinary Practice I (6)

VMC 737. Veterinary Anesthesiology (4)

VMC 780. Veterinary Medical Preceptorship (4)

VMC 782. Emergency Care (1)

VMC 791. Clinical Small Animal Medicine (6)

VMC 793. Clinical Small Animal Surgery (6)

VMC 794. OHS Small Animal Primary Care (4)

VMC 796. Clinical Imaging (3)

VMC 797. Small Animal Critical Care and Hospital Service Rotation (1)

Additional electives required (3rd and 4th year) (5)

Total of all requirements and electives (65)

Elective Blocks (at least 5 credits required)

VMB 726. Pet Bird and Small Mammal Medicine and Surgery (2)

VMB 727. Ornamental Fish Medicine (2)

VMB 729. Lab Animal/Primate Medicine and Surgery (2)

VMB 749. Wildlife Safari (2)

VMB 756. Advanced Clinical Pathology (1)

VMB 768. Basic Histopathology (1)

VMB 772. International Veterinary Medicine (2)

VMB 786. Advanced Histopathology (1)

VMC 714. Small Animal Dentistry (1)

VMC 715. Small Animal Case Studies I (1)

VMC 716. Small Animal Case Studies II (1)

VMC 717. Small Animal Case Studies III (1)

- VMC 718. Small Animal Preventive Medicine (2)
- VMC 721. Small Animal Clinical Nutrition (1)
- VMC 723. Advanced Feline Medicine (2)
- VMC 726. Small Animal Theriogenology (1)
- VMC 727. Advanced Small Animal Surgery (2)
- VMC 731. Small Animal Emergency Care—Dove Lewis (3)
- VMC 740. Sheep and Goat Medicine and Surgery (3)
- VMC 741. Large Animal GI Surgery (2)
- VMC 742. Camelid Medicine and Surgery (4)
- VMC 743. Advanced Equine Reproduction (3)
- VMC 744. Advanced Lameness in Equine (3)
- VMC 746. Caine Center Food Animal Medicine (6)
- VMC 747. Veterinary Anesthesiology II (3)
- VMC 748. Equine Dentistry (2)
- VMC 751. Ruminant Nutrition (2)
- VMC 752. Clinical Large Animal Medicine II (3–6)
- VMC 754. Clinical Large Animal Surgery II (3)
- VMC 755. Rural Veterinary Practice II (3–6)
- VMC 758. Cattle Production Medicine (3)
- VMC 759. Large Animal Palpation (1)
- VMC 763. Advanced Clinical Cardiology (1)
- VMC 779. Equine Sports Medicine (1)
- VMC 788. Business Applications in SA Practice (1–2)
- VMC 789. Pet Practice (3)
- VMC 792. Clinical Small Animal Medicine II (3)
- VMC 798. Clinical Small Animal Surgery II (3–6)

STATE OF OREGON DVM LICENSING REGULATIONS

Oregon Veterinary Medical Examining Board

Requirements

1. Graduate of a veterinary medical school accredited by the AVMA, or if a foreign graduate, have a certificate from ECFVG, PAVE or other equivalency program approved by the board.
2. Passed the NBC/CCT or NAVLE and Juris Prudence exams.
3. If you have less than one year's U.S. experience, you must obtain an intern permit and practice under the supervision of an Oregon-licensed veterinarian for one year (or the balance of a year).

*If you meet the following conditions, you may include a letter requesting waiver of the CCT. Your letter must cite compliance with each of these requirements:

- Graduate of an accredited veterinary school or earned ECFVG certificate prior to 1991;
- Engaged in five contiguous years of active veterinary clinic practice immediately preceding date of application;
- Have held license(s) in good standing in other US states or provinces since graduation; and

- Have continuing education of at least 10 hours per year during the five years immediately preceding date of application.

EXAMINATIONS

Scores must be reported directly to the board from VIVA. If you tested in Oregon, you do not need to request a score transfer.

North American Veterinary Licensing Examination (NAVLE): Administered via computer during two periods in spring and winter. Passing score as established by National Board Examination Committee.

NBE/CCT: Passing score before December 1992 is 75.00 based on 1.5 standard deviations. After December 1992, passing score is the criterion referenced score of 425.

Jurisprudence Exam: An open-book 40-question test on veterinary laws and rules of Oregon. The exam and regulations will be sent to applicants upon receipt of the license application and \$75 fee. A passing score of 95 percent (38 correct answers) is required.

LICENSING

Complete and submit the application and fee. The Jurisprudence Exam will be sent to you to complete and return. When you pass the JP exam, you will be sent an activation form. You may not practice in Oregon until you activate your license or intern permit. Complete and send in the activation form, along with the \$100 fee. Your permanent license or intern permit will be issued upon receipt of all necessary documentation.

Permanent Licenses: If you have at least one year's documented veterinary clinical experience, you may activate your permanent license.

Intern Permits: New graduates or veterinarians with less than one year's experience must obtain an intern permit. This permit expires one year after date of issue or less if prior experience is documented. Renewal notices are sent approximately six weeks prior to expiration date, at which time interns may activate their permanent license or request another intern permit if one year's experience has not been acquired. Current veterinary school seniors may submit application materials prior to graduation; however an intern permit will not be issued until the board receives either a dean's letter confirming graduation or a diploma copy.

Continuing Education: Active licensees are required to report 30 credits of CE every odd year, i.e. '11, '13, '15, etc.

COMPARATIVE HEALTH SCIENCES (MS, PhD)

The Comparative Health Sciences graduate major is an interdisciplinary program administered by the Graduate School. Participating colleges include Veterinary Medicine, Public Health and Human Sciences, Pharmacy, and the Graduate School.

For further information about the graduate major, see the proposal at <https://secure.oregonstate.edu/ap/cps/proposals/view/84096> and contact the Graduate School and College of Veterinary Medicine.

MS degree students complete a total of 45 graduate credits, including 12 thesis credits.

PhD degree students complete a total of 108 graduate credits beyond the bachelor's or professional (DVM, MD) degree, including at least 36 credits of non-blanket course work.

All students complete the core curriculum and at least two electives for a total of 12 credits. Student must also complete the Biomedical Sciences option.

Required Core

Research Perspectives Lab Rotations (3) (PhD only)
ST 511. Methods of Data Analysis (4)
Biomedical Ethics (1)
Grant Application Preparation (1)
Seminar (1)

Electives

BB 550. General Biochemistry (3)
MCB 524. Molecular and Cellular Biology Techniques (1)
(New course) Introduction to Bioinformatics
(New course) Introduction to Epidemiology
(New course) Introduction to Genomics
(New course) Introduction to Immunology

BIOMEDICAL SCIENCES OPTION

Student must also complete the Biomedical Sciences option:

MS Students

VMB 521. Animal Models (3)
VMC/VMB 501. Research (5)
VMC/VMB 503. Thesis (12)
VMC/VMB 507/607. Seminar (1)
Electives (24)

PhD Students:

VMB 521. Animal Models (3)
VMB 603. Thesis (36)
VMB 671. Molecular Tools (3)
VMB 607. Seminar: Dissertation Defense (1)
Electives (53)

COMPARATIVE HEALTH SCIENCES GRADUATE MINOR

For more details, see the departmental advisor.

BIOMEDICAL SCIENCES**Luiz E. Bermudez, Head**

105 Dryden Hall

Oregon State University

Corvallis, OR 97331-4801

541-737-6532

Email: cvm.biomed@oregonstate.eduWebsite: <http://vetmed.oregonstate.edu/departments/biomedical>**FACULTY****Professors** Bermudez, Bildfell, Blythe, Craig, Gelberg, Hall, Heidel, Kent, Magnusson, Rockey, Sarker, Tornquist, Valentine**Associate Professors** Häse, Jin, Löhr, O'Reilly, Pастey**Assistant Professors** Chappell, Clark, Dolan, Gorman, Jolles, Medlock, Miller-Morgan, Moulton, Ramsey, Shulzhenko, Steinauer**Instructors** Alcantar, Mansouri, Sona**ADJUNCT**

Rodrigues-Saturn

EMERITI

Engel, Hutton, Matsumoto,

A. Smith, B. Smith, Snyder, Timm

COURTESY

Allen, Burco, Cooper, Gillin, Harrenstien, Mata

COURSES**VMB 110. PREVETERINARY MEDICINE (1).**

Introduction to the profession's role in society. Graded P/N.

VMB 309. CAPTURE AND IMMOBILIZATION TECHNIQUES (2).

Manual and chemical restraint methods are covered with an emphasis on darting equipment, animal and human safety, drug pharmacology and species-specific recommendations. Lec/lab.

VMB 328. WILDLIFE CAPTURE AND IMMOBILIZATION (2).

Manual and chemical restraint methods are covered with an emphasis on darting equipment, animal and human safety, drug pharmacology and species specific recommendations. CROSSLISTED as FW 328. Lec/lab. This course is repeatable for a maximum of 4 credits.

VMB 501. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.**VMB 503. THESIS (1-12).** This course is repeatable for a maximum of 999 credits.**VMB 505. READING AND CONFERENCE (1-16).** Graded P/N. This course is repeatable for a maximum of 16 credits.**VMB 507. SEMINAR (1-16).** Graded P/N. This course is repeatable for a maximum of 16 credits.**VMB 517. VETERINARY PHYSIOLOGY (5).**Physiology of body fluids, muscles, membranes, intermediary metabolism, cardiovascular system, and metabolism. **PREREQS:** One year of inorganic chemistry, including a lab; one upper-division course in biochemistry; one term physics; one-year sequence in general biological sciences or equivalent; instructor approval required.**VMB 518. VETERINARY PHYSIOLOGY (5).**Physiology of gastrointestinal, endocrine and reproductive systems. **PREREQS:** VMB 517 and instructor approval required.**VMB 519. VETERINARY PHYSIOLOGY (4).**Physiology of respiratory and renal systems and acid-base balance. **PREREQS:** VMB 518 and instructor approval required.**VMB 521. ANIMAL MODELS (3).**Selection/use criteria for models describing animal or human diseases or processes with emphasis on experimental design, validation, transgenic technology, population dynamics, husbandry, and ethics. **PREREQS:** Graduate standing or advanced undergraduate in science or engineering, with permission of the instructor.**VMB 523. ZONOOSES (3).**Interactive examination of the molecular basis of diseases that are transmissible between animals and humans. Emphasis on bacterial, viral and parasitic pathogens of animals and humans. **PREREQS:** Graduate standing or advanced undergraduate in science or engineering, with permission of instructor.**VMB 524. BIOANALYTICAL CHEMISTRY (3).**Analytical methods employed in the study of biologically important molecules. Separations (chromatography, electrophoresis), spectroscopy, mass spectrometry, biosensors, and immunoassays. Lec/lab. Not offered every year. CROSSLISTED as CH 524. **PREREQS:** One year of organic chemistry and one term of organic chemistry laboratory.**VMB 601. RESEARCH (1-16).** Graded P/N. This course is repeatable for a maximum of 16 credits.**VMB 603. THESIS (1-16).** This course is repeatable for a maximum of 999 credits.**VMB 605. READING AND CONFERENCE (1-16).**

This course is repeatable for a maximum of 16 credits.

VMB 606. PROJECTS (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.**VMB 607. SEMINAR (1-16).** One-credit section; VMB 607 Sect. 1. Graded P/N. This course is repeatable for a maximum of 16 credits.**VMB 611. VETERINARY GROSS ANATOMY (4).**Systematic and topographic study and dissection of the dog, cat, horse, ruminant, pig, and chicken. **PREREQS:** One year of inorganic chemistry, including a lab; one upper-division course in biochemistry; one term of physics; one year sequence in general biological sciences or equivalent. Instructor approval required. VMB 611, VMB 612, VMB 613 must be taken in sequence.**VMB 612. VETERINARY GROSS ANATOMY (4).**Systematic and topographic study and dissection of the dog, cat, horse, ruminant, pig, and chicken. **PREREQS:** VMB 611; one year of inorganic chemistry, including a lab; one upper-division course in biochemistry; one term in physics; one-year sequence in general biological sciences or equivalent; instructor approval required.**VMB 613. VETERINARY GROSS ANATOMY (4).**Systematic and topographic study and dissection of the dog, cat, horse, ruminant, pig, and chicken. **PREREQS:** VMB 612; one year of inorganic chemistry, including a lab; one upper-division course in biochemistry; one term of physics; one-year sequence in general biological sciences or equivalent; instructor approval required.**VMB 614. VETERINARY MICROSCOPIC ANATOMY (4).**Structure and development of cells, tissues, organs, and organ systems of animals. **PREREQS:** One year of inorganic chemistry, including a lab; one upper-division course in biochemistry; one term of physics; one-year sequence in general biological sciences or equivalent; instructor approval required. VMB 614 and VMB 615 must be taken in sequence.**VMB 615. VETERINARY MICROSCOPIC ANATOMY (3).**Structure and development of cells, tissues, organs, and organ systems of animals. **PREREQS:** VMB 614; one year of inorganic chemistry, including a lab; one upper-division course in biochemistry; one term of

physics; one-year sequence in general biological sciences or equivalent; instructor approval required.

VMB 620. VETERINARY IMMUNOLOGY (5).Clinical and diagnostic aspects of immunological mechanisms, serological reactions; hypersensitivity, allergy, and disorders of the immune system. **PREREQS:** One upper-division course in biochemistry; one year of physics; one-year sequence in general biological sciences or equivalent; instructor approval required.**VMB 621. GENERAL PATHOLOGY (4).**General principles of pathology, cell injury and death, inflammation and tissue repair, abnormalities of cell growth, and structures and mechanisms of disease. **PREREQS:** One year of inorganic chemistry, including a lab; one upper-division course in biochemistry; one term of physics; one-year sequence in general biological sciences or equivalent; must be taken in sequence. Instructor approval required.**VMB 622. PATHOLOGY LABORATORY (1).**Laboratory instruction to complement VMB 621. **PREREQS:** VMB 611* and one course in histology and instructor approval required.**VMB 627. ORNAMENTAL FISH MEDICINE (2).**An introduction to the basic principles of ornamental fish medicine including basic husbandry, handling and clinical procedures. This is a 1-week intensive course held at the Hatfield Marine Science Center in Newport, Oregon. Graded P/N. **PREREQS:** Graduate standing and instructor's permission.**VMB 630. MECHANISMS OF DISEASE (3).**Cellular and molecular events that contribute to the pathogenesis of disease in animals, including humans. Host interactions with infectious agents and the environment. **PREREQS:** Graduate status in a biomedical discipline. Prior courses in biochemistry, immunology, microbiology, and physiology are recommended. Instructor approval required.**VMB 631. MATHEMATICAL MODELING OF BIOLOGICAL SYSTEMS (3).**The use of mathematical modeling in biological sciences is studied. A variety of modeling techniques are covered including implementing the methods computationally. **PREREQS:** Graduate standing or permission of instructor.**VMB 640. SEMINARS IN LABORATORY ANIMAL MEDICINE (2).**Prepares students for careers in laboratory animal medicine. Provides a review of medical conditions, diagnosis and treatment of research animals. **PREREQS:** DVM degree or equivalent or permission of instructor.**VMB 641. SEMINARS IN LABORATORY ANIMAL MEDICINE (2).**Prepares students for careers in laboratory animal medicine. Provides a review of medical conditions, diagnosis and treatment for research animals. **PREREQS:** DVM or equivalent required or permission of instructor.**VMB 642. SEMINARS IN LABORATORY ANIMAL MEDICINE (2).**Prepares students for careers in laboratory animal medicine. Provides a review of medical conditions, diagnosis and treatment for research animals. **PREREQS:** DVM or equivalent required or permission of instructor.**VMB 651. SELECTED TOPICS IN VETERINARY MEDICINE (3).**Topics vary; check Schedule of Classes for particular topics. **PREREQS:** Graduate standing and instructor approval required.**VMB 653. VETERINARY VIROLOGY (4).**Virology for the professional and graduate student. **PREREQS:** Graduate standing or advanced undergraduate in science or engineering, with permission of instructor.**VMB 659. VETERINARY BACTERIOLOGY AND MYCOLOGY (5).**Veterinary bacteriology and mycology for the veterinary graduate student. **PREREQS:** Graduate standing or advanced undergraduate in science or engineering, with permission of instructor.

VMB 660. VETERINARY PARASITOLOGY (5). A study of the parasitic diseases of domestic animals with an emphasis on diagnosis and treatment. Fundamentals in host-parasite interactions, taxonomy and life cycle strategies are covered. **PREREQS:** Graduate standing or advanced undergraduate in science or engineering, with permission of instructor.

VMB 663. VETERINARY DIAGNOSTIC PATHOLOGY (6). Practical hands-on course training students in the diagnostic pathology utilizing case material received at the OSU Veterinary Diagnostic Lab. Graded P/N. **PREREQS:** DVM degree or equivalent required.

VMB 664. COMPARATIVE MICROSCOPIC PATHOLOGY (1). Case-based discussion course to train participants in the recognition, description, and pathogenesis of a wide variety of disease processes with an emphasis on microscopic features. Graded P/N. This course is repeatable for a maximum of 4 credits. **PREREQS:** DVM degree or equivalent.

VMB 665. READINGS IN VETERINARY PATHOLOGY (1). Group discussions of assigned readings central to understanding of veterinary pathology, including recent advances. Graded P/N. This course is repeatable for a maximum of 6 credits. **PREREQS:** DVM degree or equivalent.

VMB 666. VETERINARY MEDICINE AND PUBLIC HEALTH (3). Covers aspects of veterinary medicine that affect human health. An understanding of the contribution of the veterinary profession to human (public) health will enable students to play an effective role in this area, regardless of career direction. **PREREQS:** Instructor permission or admission to MPH degree program.

VMB 667. VETERINARY EPIDEMIOLOGY (3). A course for veterinary students describing the factors determining the frequency and distribution of diseases, in a defined population of animals for the purpose of establishing programs to prevent and control their development and spread in this population. **PREREQS:** Graduate standing and instructor approval required.

VMB 671. MOLECULAR TOOLS (3). Intended for personnel with some scientific background who are seeking basic- and advanced-level molecular biology knowledge and who wish to become involved with molecular biology-related and biotechnological research. **CROSSLISTED** as MCB 671. **PREREQS:** Graduate standing or advanced undergraduate in science or engineering, with permission of instructor.

VMB 672. MOLECULAR APPROACH TO CANCER (1). Overview of cancer pathogenesis and current molecular techniques to diagnose and treat various neoplasms is provided. Content will include both veterinary and human data and concepts. Discussion/Lab. Graded P/N.

VMB 673. COMPARATIVE IMMUNOLOGY (3). Examines immune system function in animals other than mice and men with a focus on adapting cutting-edge technologies. **PREREQS:** Baccalaureate degree or instructor permission

VMB 701. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

VMB 705. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

VMB 706. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

VMB 709. VETERINARY MEDICINE ORIENTATION (1). An overview of veterinary medicine with emphasis on historical development, current veterinary medical issues, employment opportunities, and professionalism. Graded P/N. **PREREQS:** First-year standing in veterinary medicine.

VMB 711. VETERINARY GROSS ANATOMY (4). Systematic and topographic study and dissection of the dog, cat, horse, ruminant, pig, and chicken. **PREREQS:** First-year standing in veterinary medicine. VMB 711, VMB 712, VMB 713 must be taken in sequence.

VMB 712. VETERINARY GROSS ANATOMY (4). Systematic and topographic study and dissection of the dog, cat, horse, ruminant, pig, and chicken. **PREREQS:** VMB 711 and first-year standing in veterinary medicine. VMB 711, VMB 712, VMB 713 must be taken in sequence.

VMB 713. VETERINARY GROSS ANATOMY (4). Systematic and topographic study and dissection of the dog, cat, horse, ruminant, pig, and chicken. Lec/lab. **PREREQS:** VMB 712 and first-year standing in veterinary medicine. VMB 711, VMB 712, VMB 713 must be taken in sequence.

VMB 714. VETERINARY MICROSCOPIC ANATOMY (4). Structure and development of cells, tissues, organs, and organ systems of animals. **PREREQS:** First-year standing in veterinary medicine.

VMB 715. VETERINARY MICROSCOPIC ANATOMY (3). Structure and development of cells, tissues, organs, and organ systems of animals. **PREREQS:** VMB 714 and first-year standing in veterinary medicine.

VMB 716. VETERINARY NEUROSCIENCES (4). Structural and functional relationships of the nervous system and organs of special sense with emphasis on general clinical application. **PREREQS:** First-year standing in veterinary medicine.

VMB 717. VETERINARY PHYSIOLOGY (5). Physiology of body fluids, excretion, respiration, acid-base balance, blood, muscle, bone, cardiovascular system, digestion, metabolism, endocrine system, reproduction, and lactation. **PREREQS:** First-year standing in veterinary medicine. VMB 717, VMB 718, VMB 719 must be taken in sequence.

VMB 718. VETERINARY PHYSIOLOGY (5). Physiology of body fluids, excretion, respiration, acid-base balance, blood, muscle, bone, cardiovascular system, digestion, metabolism, endocrine system, reproduction, and lactation. **PREREQS:** VMB 717 and first-year standing in veterinary medicine.

VMB 719. VETERINARY PHYSIOLOGY (4). Physiology of body fluids, excretion, respiration, acid-base balance, blood, muscle, bone, cardiovascular system, digestion, metabolism, endocrine system, reproduction, and lactation. Lec/lab. **PREREQS:** VMB 718 and first-year standing in veterinary medicine.

VMB 720. VETERINARY IMMUNOLOGY (5). Clinical and diagnostic aspects of immunological mechanisms, serological reactions, hypersensitivity, allergy, and disorders of the immune system. Lec/lab. **PREREQS:** First-year standing in veterinary medicine.

VMB 721. VETERINARY PATHOLOGY (5). Basic mechanisms and concepts relating to reaction of cells and tissues to disease, with emphasis on cellular and tissue degeneration, inflammatory reaction, circulatory disturbance and neoplasia. Lec/lab. **PREREQS:** First-year standing in veterinary medicine.

VMB 726. PET BIRD AND SMALL MAMMAL MEDICINE AND SURGERY (2). Medicine and surgery of pet birds and small animals. Graded P/N. **PREREQS:** Third-year standing in veterinary medicine.

VMB 727. ORNAMENTAL FISH MEDICINE (2). An introduction to the basic principles of ornamental fish medicine including basic husbandry, handling and clinical procedures. Graded P/N. **PREREQS:** Fourth-year standing in veterinary medicine.

VMB 728. SPECIAL ANIMAL MEDICINE (4). Diagnosis, treatment, and management of special animals, including the common laboratory animals. This course is repeatable for a maximum of 8 credits. **PREREQS:** Third-year standing in veterinary medicine.

VMB 729. LAB ANIMAL/PRIMATE MEDICINE AND SURGERY (3-12). Designed to provide hands-on experience with a variety of laboratory animal species including primates, rodents, ungulates, fish, and reptiles. May be repeated up to 4 times for 3, 6, 9 or 12 credits per term. 12 credits maximum apply toward graduation. Graded P/N. This course is repeatable for a maximum of 12 credits. **PREREQS:** Completion of first year of veterinary medicine.

VMB 736. DIAGNOSTIC CLINICAL PATHOLOGY (2). One week clinical experience in clinical pathology, cytology, urinalysis, clinical chemistry interpretation and hematology. Lec/lab.

VMB 740. VETERINARY INTEGRATED PROBLEM SOLVING (1). The first of three 1-credit courses in problem solving and integration of clinical cases and basic sciences in the veterinary curriculum. **PREREQS:** First-year professional standing.

VMB 741. VETERINARY INTEGRATED PROBLEM SOLVING (1). The second of three 1-credit courses in problem solving and integration of clinical cases and basic sciences in the veterinary curriculum. **PREREQS:** First-year professional standing.

VMB 742. VETERINARY INTEGRATED PROBLEM SOLVING (1). The third of three 1-credit courses in problem solving and integration of clinical cases and basic sciences in the veterinary curriculum. Graded P/N. **PREREQS:** First-year professional standing.

VMB 743. VETERINARY INTEGRATED PROBLEM SOLVING (1). A course in problem solving and integration of clinical cases and basic sciences in the veterinary curriculum. Students learn through interaction with their peers and with independent study outside of class. Graded P/N. This course is repeatable for a maximum of 4 credits.

VMB 744. VETERINARY INTEGRATED PROBLEM SOLVING (1). A course in problem solving and integration of clinical cases and basic sciences in the veterinary curriculum. Students learn through interaction with their peers and with independent study outside of class. Graded P/N. **PREREQS:** Second-year professional standing.

VMB 745. COMMUNICATIONS FOR VETERINARIANS (1). Communications and problem solving for the third-year veterinary student. Graded P/N. **PREREQS:** Third-year standing in veterinary medicine.

VMB 749. WILDLIFE SAFARI (2). Clinical training in the care of exotic and zoo animal species. Graded P/N. **PREREQS:** Fourth-year standing in veterinary medicine.

VMB 750. SYSTEMIC PATHOLOGY I (4). Examines the principles of system and organ responses to injury and the consequent effects of these changes on the host. **PREREQS:** Second-year professional standing.

VMB 751. SYSTEMIC PATHOLOGY II (5). Examines the principles of system and organ responses to injury and the consequent effects of these changes on the host. **PREREQS:** Second-year professional standing.

VMB 753. VETERINARY VIROLOGY (4). Virology for the professional DVM student. **PREREQS:** Second-year professional standing.

VMB 756. CLINICAL SERVICE II (6). Advanced clinical experience in radiology, clinical pathology, microbiology, or necropsy. Graded P/N. **PREREQS:** VMB 736 and Fourth-year standing in veterinary medicine.

VMB 759. VETERINARY BACTERIOLOGY AND MYCOLOGY (5). Bacteriology and mycology for the professional DVM student. **PREREQS:** Second-year professional standing.

VMB 760. VETERINARY PARASITOLOGY (5). A study of the parasitic diseases of domestic animals with an emphasis on diagnosis and treatment. Fundamentals in host-parasite interactions, taxonomy and life cycle strategies are covered. **PREREQS:** Second-year professional standing.

VMB 761. VETERINARY PHARMACOLOGY (2). Fundamentals of pharmacology as related to veterinary medicine presented in a systems-oriented approach with drug therapy in domestic animals. **PREREQS:** Second-year professional standing.

VMB 762. VETERINARY PHARMACOLOGY II (4). Fundamentals of pharmacology as related to veterinary medicine presented in a systems-oriented approach with drug therapy in domestic animals. **PREREQS:** Second-year professional standing.

VMB 763. VETERINARY CLINICAL PATHOLOGY (4). Clinical pathology for the professional DVM student. **PREREQS:** Second-year professional standing.

VMB 765. VETERINARY TOXICOLOGY (4). A study of toxic agents, mechanisms of action, toxicosis and treatments, especially as related to domestic and wild animals, with principles of toxicity testing, clinical diagnosis, and identification of poisonous plants. Lec/lab. **PREREQS:** Second-year professional standing.

VMB 766. VETERINARY MEDICINE AND PUBLIC HEALTH (3). Examines aspects of veterinary medicine that affect human health. An understanding of the contributions of the veterinary profession to human health will enable you to play an effective role in this area, regardless of your career direction. **PREREQS:** Second-year professional standing.

VMB 767. VETERINARY EPIDEMIOLOGY (3). Examines factors determining the frequency and distribution of diseases in a defined population of animals for the purpose of establishing programs to prevent and control their development and spread in this population.

VMB 768. BASIC HISTOPATHOLOGY (1). A rotation in histopathology at the Veterinary Diagnostic Laboratory. Emphasis is placed on case evaluation, diagnosis and report writing of biopsies of all species. Graded P/N. **PREREQS:** VMB 751 and third-year standing in veterinary medicine.

VMB 769. ANIMAL GENOMICS (1). Discussion about the dog and cow genomes, susceptibility to diseases, and the possibilities and techniques for treatment of medical conditions by gene transfer and modification. **PREREQS:** Mandatory graduate standing in science or third- or fourth-year student in the College of Veterinary Medicine.

VMB 772. INTERNATIONAL VETERINARY MEDICINE (2). Veterinary students work with veterinarians and domestic animals in international settings. Graded P/N. This course is repeatable for a maximum of 4 credits.

VMB 774. LABORATORY ANIMAL MEDICINE (6). Clinical experience related to diagnosis, treatment, and management of laboratory animals. Graded P/N. **PREREQS:** Fourth-year professional standing.

VMB 775. PRACTICE MANAGEMENT (2). Examines the world of work and career development theories using career assessment, literature, media and computer resources. Graded P/N. This course is repeatable for a maximum of 2 credits. **PREREQS:** Third-year professional standing.

VMB 786. ADVANCED HISTOPATHOLOGY (2). A rotation in histopathology at the Veterinary Diagnostic Laboratory. Emphasis is placed on case evaluation, diagnosis and report writing of biopsies of all species. **PREREQS:** Fourth-year standing in veterinary medicine, VMB 751 is mandatory.

VMB 795. DIAGNOSTIC SERVICES (2). Students will perform service duty in the necropsy area of the Veterinary Diagnostic Laboratory and will perform necropsies on delivered specimens. Other activities.

CLINICAL SCIENCES

Chris Cebra, Chair

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FACULTY

Professors Cebra, Helfand, Riebold, Sisson

Associate Professors Baltzer, Estill, Huber, Mandsager, McKenzie, Parker, Semevolos, Stieger-Vanegas

Assistant Professors Bracha, Gordon, Mecham, Miller, Milovancev, Montilla, Nemanic, Poulsen, Ruau, Schlipf, Scollan, Stieger-Vanegas, Vanegas, Warnock, Zellmer

EMERITI

Crisman, Pearson, Watrous

ADJUNCT

Campbell

COURTESY

Brown, Otteman

COURSES

VMC 501. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

VMC 503. THESIS (1-12). This course is repeatable for a maximum of 999 credits.

VMC 505. READING AND CONFERENCE (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

VMC 507. SEMINAR (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

VMC 601. RESEARCH (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

VMC 603. THESIS (1-16). This course is repeatable for a maximum of 999 credits.

VMC 605. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

VMC 606. PROJECTS (1-16). Graded P/N. This course is repeatable for a maximum of 16 credits.

VMC 607. SEMINAR (1-16). One-credit section; VMC 607 Sect. 1. Graded P/N. This course is repeatable for a maximum of 16 credits.

VMC 632. POSTGRADUATE MEDICINE (3-7). An interactive, practical course on the role of scholarship in clinical medicine, including techniques to develop and conduct research in

a clinical setting. This course is repeatable for a maximum of 16 credits. **PREREQS:** Enrollment in a clinical residency and DVM degree or equivalent and graduate standing.

VMC 634. POSTGRADUATE SURGERY (3-7). An interactive, practical course on the role of scholarship in clinical surgery, including techniques to develop and conduct research in a clinical setting. This course is repeatable for a maximum of 16 credits. **PREREQS:** Enrolled in CVM residency program and graduate standing.

VMC 637. POSTGRADUATE CARDIOLOGY (3-7). An interactive, practical course on the role of scholarship in clinical cardiology, including techniques to develop and conduct research in a clinical setting. This course is repeatable for a maximum of 16 credits. **PREREQS:** Enrollment in a clinical residency and DVM degree or equivalent and graduate standing.

VMC 651. SELECTED TOPICS IN VETERINARY MEDICINE (3). Topics vary; check Schedule of Classes for particular topics. **PREREQS:** Graduate standing and instructor approval required.

VMC 680. VETERINARY MEDICAL PRECEPTORSHIP (1-16). Clinical experience in veterinary medicine for students in the combined DVM-MPH program. Graded P/N. This course is repeatable for a maximum of 16 credits.

VMC 682. TOPICS IN INTERNAL MEDICINE (2-4). In-depth investigation of important topics in physiology, pathophysiology, treatment, diagnosis, and other aspects of internal medicine through investigation of primary literature and recent reviews. This course is repeatable for a maximum of 16 credits. **PREREQS:** Enrollment in a clinical residency and DVM degree or equivalent.

VMC 684. TOPICS IN SURGERY (2-4). In-depth investigation of important topics in physiology, pathophysiology, treatment, diagnosis, and other aspects of surgery through investigation of primary literature and recent reviews. This course is repeatable for a maximum of 16 credits. **PREREQS:** Enrollment in a clinical residency and DVM degree or equivalent.

VMC 701. RESEARCH (1-16). This course is repeatable for a maximum of 16 credits.

VMC 705. READING AND CONFERENCE (1-16). This course is repeatable for a maximum of 16 credits.

VMC 706. PROJECTS (1-16). This course is repeatable for a maximum of 16 credits.

VMC 711. CLINICAL CARDIOLOGY (1-4). A one-week clinical elective rotation in cardiology at the Veterinary Teaching Hospital. May be repeated up to 4 times, two weeks or more is encouraged. This course is repeatable for a maximum of 4 credits. **PREREQS:** Fourth-year standing in veterinary medicine required.

VMC 712. CLINICAL ONCOLOGY (1-4). A one-week clinical elective rotation in clinical oncology at the Veterinary Teaching Hospital. May be repeated up to 4 times, two weeks or more is encouraged. This course is repeatable for a maximum of 4 credits. **PREREQS:** VMC 778 and fourth-year standing in veterinary medicine.

VMC 714. SMALL ANIMAL DENTISTRY (1). A clinical course designed to provide students with hands-on training in diagnosis, treatment and prophylaxis of dental diseases of dogs and cats. **PREREQS:** 4th-year standing in the professional veterinary curriculum.

VMC 715. CASE STUDIES IN SMALL ANIMAL MEDICINE I (1). A case-based course involving diseases and conditions of the endocrine, gastrointestinal and hepatobiliary systems as well as neoplastic and infectious diseases of small animals. **PREREQS:** Third-year professional standing in veterinary medicine.

VMC 716. CASE STUDIES IN SMALL ANIMAL MEDICINE II (1). A case-based course involving diseases and conditions of the cardiovascular, respiratory and urogenital systems as well as emergent diseases and conditions. **PREREQS:** Third-year professional standing in veterinary school.

VMC 717. CASE STUDIES IN SMALL ANIMAL MEDICINE III (1). A case-based course involving diseases and conditions of the dermatologic, neurologic, ophthalmologic, and hemolympathic systems. **PREREQS:** Third-year professional standing in veterinary school.

VMC 718. SMALL ANIMAL PREVENTIVE MEDICINE (2). Introductory course to basic concepts in small animal preventive medicine including vaccine immunology, vaccine strategies, internal/external parasite control, nutrition in disease prevention, and wellness programs for dogs and cats. **PREREQS:** Third-year standing in veterinary school.

VMC 720. VETERINARY CLINICAL NUTRITION (2). To examine the nutritional needs of many species of veterinary importance. Emphasis is placed on designing feeding programs to optimize health and animal performance. **PREREQS:** First-year standing in the professional veterinary curriculum.

VMC 721. SMALL ANIMAL CLINICAL NUTRITION (1). Introduction to the concepts of small animal clinical nutrition and is designed for the third-year veterinary student. **PREREQS:** Third-year standing in veterinary medicine recommended.

VMC 723. ADVANCED FELINE MEDICINE (2). A one-week elective for senior students in the DVM curriculum. The course emphasizes aspects of internal medicine specific to the domestic cat. Graded P/N.

VMC 724. LARGE ANIMAL SURGERY (6). Selected surgical techniques and procedures related to equine and food animal species. This course is repeatable for a maximum of 6 credits. **PREREQS:** Third-year standing in veterinary medicine.

VMC 725. PRINCIPLES OF SURGERY (4). A basic course in the principles and techniques of surgery for the professional veterinary student. Lec/lab. **PREREQS:** Second-year standing in veterinary medicine.

VMC 726. SMALL ANIMAL THERIOGENOLOGY (1). Advanced clinical experience in small animal (canine) reproduction. Graded P/N. **PREREQS:** VMC 783

VMC 727. ADVANCED SMALL ANIMAL SURGERY (2). One-week of additional lectures and laboratories to improve surgical skills and acquire more advanced knowledge of specific surgical conditions. Lec/lab. Graded P/N. **PREREQS:** Fourth-year standing in veterinary medicine is mandatory.

VMC 731. SMALL ANIMAL EMERGENCY CARE-DOVE LEWIS (3). A two-week clinical rotation at the Dove Lewis Memorial Emergency Clinic in Portland, OR. **PREREQS:** Fourth-year standing in veterinary medicine.

VMC 732. CLINICAL LARGE ANIMAL MEDICINE I (6). Clinical medicine training in diseases of food animals and horses; clinic rounds and diagnostic procedures. This course is repeatable for a maximum of 12 credits. **PREREQS:** Fourth-year standing in veterinary medicine.

VMC 734. CLINICAL LARGE ANIMAL SURGERY I (6). Clinical surgery, treatment, and care of food animals and horses; clinical rounds; training in surgery, lameness, and diagnostic procedures. This course is repeatable for a maximum of 12 credits. **PREREQS:** Fourth-year standing in veterinary medicine.

VMC 735. RURAL VETERINARY PRACTICE I (6). Rural practice training in diseases of food animals and horses. This course is repeatable for a maximum of 12 credits. **PREREQS:** Fourth-year standing in veterinary medicine.

VMC 737. LARGE ANIMAL ANESTHESIOLOGY (4). A three-week rotation in veterinary anesthesiology utilizing patients presented to the veterinary teaching hospital. **PREREQS:** Fourth-year standing in veterinary medicine.

VMC 738. INTRODUCTION TO ANIMAL CARE (3). Feeding, housing, breeding and marketing systems related to animal care. This course is repeatable for a maximum of 6 credits. **PREREQS:** First-year standing in veterinary medicine.

VMC 739. VETERINARY MEDICAL ETHICS (1). Introduction of ethics in veterinary medicine, with specific attention to ethical theories, ethical decision making, moral status of animals, professional ethics, and practice issues.

VMC 740. SHEEP AND GOAT MEDICINE AND SURGERY (3). Discussions of economically important sheep and goat diseases, practical surgeries, and a review of nutrition and husbandry. Graded P/N. **PREREQS:** Fourth-year standing in veterinary medicine.

VMC 741. LARGE ANIMAL GI SURGERY (2). A one-week course for 4th year veterinary students, with particular interest in gastrointestinal surgery. Graded P/N. **PREREQS:** Fourth-year standing in veterinary medicine.

VMC 742. CAMELID MEDICINE AND SURGERY (4). Designed to give students an in-depth introduction to camelid health care via hands-on work, lectures, and discussion sections. Graded P/N. **PREREQS:** Fourth-year standing in veterinary medicine.

VMC 743. ADVANCED EQUINE REPRODUCTION (3). A two-week course in advanced clinical experience in equine reproduction. Graded P/N. **PREREQS:** Third-year standing in veterinary medicine recommended.

VMC 744. ADVANCED LAMENESS IN EQUINE (3). Application of anatomy, lameness examination, nerve and joint anesthesia, diagnostic radiology, ultrasound and nuclear scintigraphy to diagnosis of lameness in horses. Graded P/N. **PREREQS:** Fourth-year standing in veterinary medicine.

VMC 746. CAINE CENTER FOOD ANIMAL MEDICINE (6). Food animal production medicine providing experience with field investigation and clinical cases. Graded P/N. **PREREQS:** Fourth-year standing in veterinary medicine.

VMC 747. VETERINARY ANESTHESIOLOGY II (3). An additional two-week clinical rotation in veterinary anesthesiology utilizing patients presented to the Veterinary Teaching Hospital. Graded P/N. **PREREQS:** Fourth-year standing in veterinary medicine.

VMC 748. EQUINE DENTISTRY (2). Utilizing modern, motorized equipment, cadaver specimens, and live hospital and client horses, students will learn and perform modern methods of equine dental prophylaxis and treatment. Graded P/N. **PREREQS:** Third-year standing in veterinary medicine.

VMC 749. CLINICAL IMAGING II (3). Advanced clinical course for 4th-year veterinary students in which they will assume additional responsibility for performing common radiographic procedures. Graded P/N. **PREREQS:** VMC 796 and fourth-year standing in veterinary medicine.

VMC 750. EQUINE CLINICAL NUTRITION (1). A one-week course for veterinary students focusing on equine nutrition that can be used in veterinary practice. Graded P/N. **PREREQS:** Third-year standing in veterinary medicine.

VMC 751. RUMINANT NUTRITION (2). An advanced course in clinical ruminant nutrition dealing with nutritional problems of ruminants that might be encountered by a practicing veterinarian. Graded P/N. **PREREQS:** Third-year standing in veterinary medicine and basic nutrition recommended.

VMC 752. CLINICAL LARGE ANIMAL MEDICINE II (3-6). Additional clinical medicine training. Graded P/N. This course is repeatable for a maximum of 6 credits. **PREREQS:** VMC 732

VMC 754. CLINICAL LARGE ANIMAL SURGERY II (3 or 6). Additional clinical surgery training. Graded P/N. This course is repeatable for a maximum of 6 credits. **PREREQS:** VMC 734

VMC 755. RURAL VETERINARY PRACTICE II (3-6). One additional rural practice training. Graded P/N. This course is repeatable for a maximum of 6 credits. **PREREQS:** VMC 735

VMC 757. SMALL ANIMAL SURGERY (6). Small animal medicine and surgical techniques and procedures. Graded P/N. **PREREQS:** Fourth-year professional standing.

VMC 758. CATTLE PRODUCTION MEDICINE (3). Clinical application of production medicine practices to dairy and beef cattle practice. Graded P/N. **PREREQS:** VMC 735 and fourth-year professional standing or instructor approval required.

VMC 759. LARGE ANIMAL PALPATION (1). A laboratory for additional experience in rectal palpation of large animals, for third-year veterinary students. Graded P/N. **PREREQS:** Third-year standing in veterinary medicine recommended.

VMC 763. ADVANCED CLINICAL CARDIOLOGY (1). An elective course for junior veterinary students detailing diagnosis and management of the common congenital and acquired cardiac diseases of domestic animals. **PREREQS:** Third-year standing in veterinary medicine.

VMC 764. DIAGNOSTIC IMAGING (4). A lecture and laboratory course in diagnostic imaging covering physics or radiography and ultrasonography, radiation safety and image interpretation for small and large animals, presented by body systems. **PREREQS:** Second-year professional standing.

VMC 765. ADVANCED CLINICAL RADIOLOGY (1). An elective advanced radiology case-based course for Year 3 veterinary medicine students that focuses on radiographic findings of commonly encountered clinical disease. **PREREQS:** VMC 764 or equivalent course.

VMC 768. PRINCIPLES OF ANESTHESIA (4). A basic course in the principles and techniques of surgery and anesthesia for the professional veterinary student. Lec/lab. **PREREQS:** Second-year professional standing.

VMC 769. GENERAL MEDICINE (2). An introduction to medicine with a discussion of the principles of medicine that would be applicable to all species. Physical examination, clinical diagnosis, pathophysiology of signs of disease in domestic animals, therapeutic principles and diagnostic procedures. **PREREQS:** Second-year professional standing.

VMC 770. LARGE ANIMAL MEDICINE I (4). The first of three courses in large animal medicine for third-year professional veterinary students covering diagnosis and treatment of domestic large animals.

VMC 771. LARGE ANIMAL MEDICINE II (4). Diagnosis, treatment and control of diseases of large domestic animals, specifically gastrointestinal, hepatobiliary diseases, weight loss, and introduction to production medicine, and some swine diseases. **PREREQS:** VMC 770

VMC 772. LARGE ANIMAL MEDICINE III (4). Diagnosis, treatment and control of diseases of large domestic animals, specifically central nervous system, mastitis, musculoskeletal, sudden death, skin, and some swine diseases. **PREREQS:** VMC 770 and VMC 771

VMC 773. MEDICINE LABORATORY I (1). Laboratory experience for third-year veterinary students concurrent with the large and small animal medicine courses. **PREREQS:** Third-year standing in veterinary medicine.

VMC 774. MEDICINE LABORATORY II (1). Laboratory experience for third-year veterinary students concurrent with the large and small animal medicine courses. **PREREQS:** Third-year standing in veterinary medicine.

VMC 776. SMALL ANIMAL MEDICINE I (5). A course for veterinary students describing major topics of small animal internal medicine, using both a systems-based approach and a problem-based approach.

VMC 777. SMALL ANIMAL MEDICINE II (5). A course for veterinary students describing major topics of small animal internal medicine, using both a systems-based approach and a problem-based approach. **PREREQS:** VMC 776

VMC 778. SMALL ANIMAL MEDICINE III (5). A course for veterinary students describing major topics of small animal internal medicine, using both a systems-based approach and a problem-based approach. **PREREQS:** VMC 776 and VMC 777

VMC 779. CANINE/EQUINE SPORTS MEDICINE (1). One-week elective encompassing basic exercise physiology, sports-related injuries, injury rehabilitation, training and nutrition of equine athletes. **PREREQS:** Fourth-year standing in the DVM program.

VMC 780. VETERINARY MEDICAL PRECEPTORSHIP (1-16). Theory of practice of veterinary medicine in a non-university situation. Graded P/N. This course is repeatable for a maximum of 16 credits. **PREREQS:** Fourth-year professional standing.

VMC 781. SEMINAR IN VETERINARY MEDICINE (1-16). Seminars and case discussions on selected topics by students, staff, and others. Graded P/N. This course is repeatable for a maximum of 16 credits.

VMC 782. EMERGENCY CARE (1). One-week rotation in the Veterinary Teaching Hospital during non-regular hours. Practice and instruction in caring for critically ill patients. **PREREQS:** Fourth-year professional standing.

VMC 783. THERIOGENOLOGY I (4). To present the clinical applications of reproductive physiology, anatomy, embryology, pathology and microbiology in domesticated animals.

VMC 785. SMALL ANIMAL SURGERY (7). A lecture and laboratory course covering the diagnosis, operative methods, and aftercare of common small animal surgical conditions.

VMC 786. ANIMAL BEHAVIOR (1). Diagnosis and treatment of feline, canine and equine problem behaviors including aggression, anxiety, house-soiling and compulsive behaviors.

VMC 787. THIRD-YEAR CLINICS (1). An introductory clinical experience for third-year veterinary students.

VMC 788. BUSINESS APPLICATIONS IN PRIVATE SMALL ANIMAL PRACTICE (1). A hands-on elective course exploring the business of small animal general practice in a case-based approach. This course is repeatable for a maximum of 2 credits. **PREREQS:** 4th year standing in veterinary school.

VMC 789. PET PRACTICE (3). Additional clinical training in primary care pet practice at a Banfield Pet Hospital. Graded P/N. This course is repeatable for a maximum of 6 credits. **PREREQS:** Fourth-year standing in veterinary medicine.

VMC 790. CLINICAL EXPERIENCE (1-16). One- to four-week periods. Section 1: Large Animal Clinical Experience/Topics (1-16). Section 2: Small Animal Clinical Experience/Topics (1-16). Section 3: Mixed Animal Clinical Experience/Topics (1-16). Section 4: Small Animal Private Practice (1-16). Section 5: Special Studies (1-16). Some sections graded P/N. Lec/lab. This course is repeatable for a maximum of 48 credits. **PREREQS:** Fourth-year professional standing.

VMC 791. CLINICAL SMALL ANIMAL MEDICINE (6). A clinical rotation in small animal internal medicine at the Veterinary Teaching Hospital. Emphasis will be placed on patient evaluation, diagnosis and treatment of diseases of dogs and cats. **PREREQS:** Fourth-year standing in veterinary medicine.

VMC 792. CLINICAL SMALL ANIMAL MEDICINE II (3-6). A two-week, three-credit clinical elective rotation in small animal internal medicine at the Veterinary Teaching Hospital. Emphasis will be placed on patient evaluation, diagnosis and treatment of diseases of dogs and cats. This course is repeatable for a maximum of 6 credits. **PREREQS:** VMC 791 is recommended.

VMC 793. CLINICAL SMALL ANIMAL SURGERY (6). Clinical training in small animal surgery in the Veterinary Teaching Hospital. **PREREQS:** VMC 725 and VMC 785 and fourth-year standing in veterinary medicine.

VMC 794. OHS SMALL ANIMAL PRIMARY CARE (4). Three-week rotation at OHS to gain experience with an emphasis on surgery, medical case workup, exam room protocol and behavior basics. **PREREQS:** Fourth-year standing in veterinary medicine.

VMC 795. NECROPSY AND EMERGENCY (3). Clinical experience in necropsy to learn proper necropsy and sample collection techniques. Students also will assist in the Veterinary Teaching Hospital during evening hours, learning to care for critically ill patients. **PREREQS:** Fourth-year standing in veterinary medicine.

VMC 796. CLINICAL IMAGING (3). A clinical course for 4th-year veterinary students in which they will assume primary responsibility for performing common radiographic procedures. **PREREQS:** Fourth-year standing in veterinary medicine.

VMC 797. SMALL ANIMAL CRITICAL CARE AND HOSPITAL SERVICE ROTATION (1). A one-week clinical rotation in small animal critical care managing small animal cases in the intensive care unit at the Veterinary Teaching Hospital. **PREREQS:** Fourth-year standing in veterinary medicine.

VMC 798. CLINICAL SMALL ANIMAL SURGERY II (3-6). Clinical training in small animal surgery in the College of Veterinary Medicine, Lois B. Acheson Veterinary Teaching Hospital. This course is repeatable for a maximum of 6 credits. **PREREQS:** VMC 725 and VMC 785 and VMC 793 recommended.

VMC 799. SPECIAL TOPICS (1-16). This course is repeatable for a maximum of 16 credits.

THE RESEARCH OFFICE

Oregon State is one of only two land, sea, space and sun grant institutions in the U.S., holds a top tier research designation from the Carnegie Foundation, and is the state's largest public research university. Oregon State research totaled almost \$263 million in fiscal year 2013, and private sector financing reached nearly \$36 million, a 42 percent increase in the past two years.

The OSU Research Agenda, integrated with the university's strategic plan, guides faculty inquiry in OSU's three signature areas of distinction: Advancing the Science of Sustainable Earth Ecosystems; Improving Human Health and Wellness; and Promoting Economic Growth and Social Progress.

Headed by the vice president for research, the Research Office serves faculty involved in research, innovation, scholarship, and creativity in all OSU colleges and in a variety of multidisciplinary centers, institutes and programs. The office provides support to secure funding, comply with regulations, partner with industry, establish collaborations across the university and raise the profile of OSU.

INCENTIVE PROGRAMS

Website: <http://oregonstate.edu/research/incentive/>

The Research Office provides funding for faculty success. The General Research Fund is for projects not otherwise supported by organized or directed programs. Faculty Release Time provides funding for developing external grant proposals or furthering scholarly activities. Research Equipment Reserve Funds help acquire, repair, renovate, or improve equipment. The Undergraduate Research, Innovation, Scholarship and Creativity Fund enables students to initiate scholarly relationships with faculty early in their academic careers.

OSU ADVANTAGE

Website: <http://oregonstate.edu/advantage/home>

The Oregon State University Advantage connects business with faculty expertise, student talent and world-class facilities to research solutions, bring ideas to market and launch companies. The OSU Advantage helps faculty take their research and projects into the marketplace where they can have real-world impacts, and provides opportunities to new sources of funding to carry on important and impactful work. Three aligned organizations offer this opportunity: Advantage Accelerator, Advantage Partnerships, and Advantage Impact.

OFFICE OF RESEARCH INTEGRITY

Website: <http://oregonstate.edu/research/ori/>

The Office of Research Integrity (ORI) works with OSU faculty, staff, and students to help assure proper conduct of research in areas pertaining to the use of

human subjects, and non-human vertebrate animals. The office also works with faculty and Academic Affairs to identify and appropriately manage issues that could be perceived to present financial conflicts of interest. The university's Small Boat and Diving Safety programs are overseen by the office, as are issues related to technology export controls. The ORI's purpose is to facilitate the research efforts of OSU faculty, staff and students by helping them to remain compliant with the many federal and state research regulations that assure the integrity of research, the safety of all, and the ethical treatment of human and animal subjects.

OFFICE OF SPONSORED PROGRAMS

Website: <http://oregonstate.edu/research/osp/>

The Office of Sponsored Programs (OSP) has central responsibility for proposal submission for sponsored research, scholarship, instructional and other activities at Oregon State and contractual compliance as it relates to sponsored activities. OSP balances service to OSU faculty and staff, university administration, and the numerous organizations that sponsor Oregon State University activities. Functions include proposal review, monitoring institutional compliance with terms and conditions, official institutional signatory, policy and procedure development, training, compliance activities related to research administration, and general funding opportunity assistance.

OFFICE FOR COMMERCIALIZATION AND CORPORATE DEVELOPMENT (OCCD)

Website: <http://oregonstate.edu/research/occd>

The OCCD leads OSU's industry-sponsored research efforts and the commercialization of OSU innovations by evaluating markets, developing an intellectual property protection strategy and executing research, confidentiality, materials transfer, licensing and other industry agreements. The OCCD is the bridge to commercial entities—from Oregon-based startups to large international companies, the OCCD facilitates OSU research to impact the world.

OFFICE FOR RESEARCH DEVELOPMENT (ORD)

Website: <http://oregonstate.edu/research/office-research-development>

The ORD provides leadership in strategic planning, implementation, coordination, and review of large research proposals across campus, and manages the University Limited Submission process. The primary responsibilities of the ORD are to identify and develop new external funding sources, increase funding support for the university, facilitate the development of research

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partnerships, research future grant opportunities, and provide education for faculty and administrators to encourage applications for grant funding.

MULTIDISCIPLINARY CENTERS AND INSTITUTES

Website: <http://oregonstate.edu/research/ci>

Addressing many of the world's most pressing challenges requires collaborative efforts of scientists, engineers, social scientists, and humanists to attain long-lasting, high impact results. OSU fosters these dynamic transdisciplinary collaborations through a variety of centers, institutes and programs. With particular strengths in material sciences, ocean and earth sciences, enterprise innovation and economic development, health sciences, and natural resources, OSU investigators, representing virtually every college on campus, team to conduct cutting-edge research, provide undergraduate and graduate education, and proactively engage communities throughout Oregon and the world in helping them address their greatest needs.

The following centers and institutes are administered by the OSU Research Office.

1. Center for Genome Research and Biocomputing
2. Center for Latin@ Studies and Engagement (CL@SE)
3. Center for Research on Lifelong STEM Learning
4. Center for the Humanities
5. Cooperative Institute for Marine Resources Studies (CIMRS)
6. Environmental Health Sciences Center
7. Hatfield Marine Science Center
8. Institute for Natural Resources (INR)
9. Institute for Water and Watersheds (IWW)
10. Laboratory Animal Resources Center (LARC)
11. Linus Pauling Institute
12. Native American Collaborative Institute (NACI)
13. Northwest National Marine Renewable Energy Center (NNMREC)
14. Oregon NASA Space Grant Consortium
15. Oregon Sea Grant
16. Radiation Center
17. Superfund Research Center

OSU RESEARCH OFFICE CENTERS AND INSTITUTES

CENTER FOR GENOME RESEARCH AND BIOCOMPUTING

Brett Tyler, Director

Website: <http://www.cgrb.oregonstate.edu/>

Mission Statement

The Center for Genome Research and Biocomputing facilitates the development, application and training in computationally intensive, genome-enabled research at OSU and across the state. Research in the CGRB and faculty affiliate laboratories seeks to improve health, better utilize natural and agricultural resources, understand our global environment, and develop new bio-based products and energy sources. The center offers leadership and services to faculty, staff and students through core laboratories, computational facilities, seminars and technology workshops, and conferences. It also provides a focal point for researchers to establish contacts, initiate collaborations, and apply new technologies in their own laboratories.

Functions of the CGRB

Over 100 OSU faculty, all holding primary appointments in academic departments of the colleges of Agricultural Sciences; Engineering; Forestry; Pharmacy; Science; Veterinary Medicine; or Earth, Ocean, and Atmospheric Sciences; are affiliate members of the center. The center was established in 1983 as a university resource to develop cell and molecular biology research. Today, the CGRB facilitates development, application and training in computationally intensive, genome-enabled research at OSU and across the state. The CGRB functions and facilities include:

1. Staffed Core Laboratory facilities that provide a variety of services in genomics, functional genomics, imaging and genotyping;
2. Staffed biocomputing facilities with an extensive hardware infrastructure, which includes a managed cluster and shared resources;
3. Computational scientists and staff to facilitate implementation of a computationally intensive research program;
4. Seminar Series that features leading scientists in molecular and genomic biosciences, and frequent technology training workshops that feature cutting-edge technologies;
5. Annual Fall Conference that brings together faculty, staff and students from across OSU;
6. Coordination of the OSU Computational and Genome Biology Initiative.

CGRB Core Laboratories

A key part of the center is the CGRB Core Laboratories that provide services, technical expertise, collaborative functions and share-use equipment for molecular bioscience research at OSU. The core labs are a fully staffed facility that serves as a focal point for acquisition and development of new instrumentation and technologies. A professional staff of five provides service in four areas:

- *Genomics*—DNA sequencing, high throughput sequencing (Illumina), genotyping and fragment analysis;
- *Functional genomics*—NimbleGen and Affymetrix GeneChip microarray services for analysis of global gene expression patterns in all types of organisms;
- *Biocomputing and bioinformatics*—advanced computational resources for data mining, data analysis and database development;
- *Imaging and image analysis*—a confocal laser scanning microscope facility for high resolution analysis of a wide variety of specimens. In addition, the center maintains a set of common-use instruments and computers for research and data presentation.
- In addition, the CGRB provides shared instrumentation, including real time PCR, scanners, robotics, and computational facilities for use by walk-in users.
- *Seminars, conferences, training*—Bi-weekly CGRB seminar, annual conference, Gene D. Knudson Lectures in Molecular Genetics, technology training (e.g. high-throughput sequencing, bioinformatics training, etc.). The center coordinates a seminar program in which faculty, staff and students can interact with outstanding scientists from other institutions and organizations. The center also sponsors a yearly conference for scientific exchange, building collaborations, strengthening ties across departmental and college boundaries, and social interaction.
- *Consolidation and coordination of bioscience faculty*—over 100 faculty are affiliated with the CGRB. The CGRB provides a consolidating function to organize large equipment grant proposals and other activities that require participation by several faculty. In addition, the CGRB is perceived by the administration to represent the interests of these faculty, who are spread across eight colleges.
- *Research*—In the past, the CGRB has not had an in-house research program. This is changing as the focus of the center shifts away

from simple service to more of a collaborative, enabling technology entity. In particular, the CGRB has developed significant capacity for genomic and computational biology. The CGRB director reports to the vice president for research. Scientific and administrative oversight and guidance are provided by a scientific advisory board, which has two external members, and an administrative advisory board.

THE CENTER FOR THE HUMANITIES

David M. Robinson, *Director*

Wendy Madar, *Associate Director*
Website: <http://oregonstate.edu/dept/humanities/>

The Center for the Humanities, established in 1984 through a grant from the National Endowment for the Humanities, is primarily concerned with the advancement of interdisciplinary humanities research. The Humanities Center provides fellowships to visiting scholars and OSU faculty members engaged in research and writing projects in literature, history, philosophy, foreign languages, and related humanities fields. Its programs are supported by the OSU Office of Research and the Oregon State University Foundation. Fellowship applications are screened by an advisory board made up of former fellows and OSU faculty from the College of Liberal Arts. The Humanities Center also hosts or sponsors research conferences, seminars, films, lectures, and other public programs in the humanities. The Humanities Center's fundamental concern is advancement in humanities research, teaching, and public presence at OSU. It is located in Autzen House, a gracious and historic building on the east edge of campus, 811 SW Jefferson Avenue. Contact: Center for the Humanities, 541-737-2450.

CENTER FOR LATIN@ STUDIES AND ENGAGEMENT (CL@SE)

Ronald L. Mize, *Director*
Website: <http://liberalarts.oregonstate.edu/centers-and-initiatives/center-latin-studies-and-engagement>

Mission Statement

The mission of the Center for Latin@ Studies and Engagement is to promote engaged research and outreach devoted to advancing knowledge and understanding of Latin@ life chances and the issues shaping their lived experiences in our state, region and beyond.

Overarching Goals

- To promote excellence in engaged research, teaching, and outreach in Latin@ Studies.

- To establish an action-based agenda which will promote the economic, political, physical, and educational well-being and development of the Latin@ community in rural and urban Oregon.
- To serve as a model for enhancing the university's capabilities in similarly targeted research and engagement efforts.
- To foster engaged research that is collaborative, trans-disciplinary, and community oriented; furthering both theoretical and applied knowledge to solve real-world problems.

Established Areas of Expertise

- Youth and Community Empowerment
- Socio-Economic Well-Being
- Health and Wellness
- Education
- Cultural and Historical Awareness

COOPERATIVE INSTITUTE FOR MARINE RESOURCES STUDIES

Michael A. Banks, *Director*
Website: <http://oregonstate.edu/groups/cimrs/>

The Cooperative Institute for Marine Resources Studies was established in 1982 to foster collaborative research between the National Oceanic and Atmospheric Administration (NOAA) and Oregon State University in fisheries, aquaculture, oceanography, and related fields. It also encourages education and training of scientists in disciplines related to marine resources.

Administered through the Vice President for Research, the institute is the academic home for a staff of 35 to 40 (total) research assistant, associate and full professors, research associates, and faculty research assistants and students. Headquartered at the Hatfield Marine Science Center in Newport, the institute hosts collaborative research with various NOAA investigators within OAR, NOS and NMFS, specifically, the Pacific Marine Environmental Laboratory, the Northwest Fisheries Science Center and the Alaska Fisheries Science Center, the West Coast Regional Office, as well as researchers from a broad range of colleges and departments within the entire OUS system.

Currently, the broad goal of the Cooperative Institute for Marine Resources Studies is to coordinate research focused on living and nonliving marine resources, under four primary themes:

- Marine Ecosystems and Habitat
- Protection and Restoration of Marine Resources
- Seafloor Processes
- Marine Bioacoustics

The institute works with projects that emphasize basic science and environmental impacts. The geographic area of interest extends over the eastern Pacific Ocean from northern California to the Bering Sea. The institute promotes cooperative projects between government and the university. Its cooperative agreements with NOAA laboratories provide a mechanism for OSU faculty, staff and students to work with federal scientists on research that leads to the understanding of global ocean processes and fisheries resource issues.

ENVIRONMENTAL HEALTH SCIENCES CENTER

Joseph Beckman, *Director*
Website: <http://www.ehsc.orst.edu/>

The Environmental Health Sciences Center was established in 1967 with funding by the National Institute of Environmental Health Sciences (NIEHS). As an organizational unit under the vice president for research, it provides resources for coordination and stimulation of interdisciplinary basic research and training related to the effects of environmental factors on human health.

Environmental quality problems and their resultant effects continue to challenge people's health and their ability to understand and manage the evolving impact of environmental agents. Solutions to environmental problems require the interdisciplinary scientific efforts of professionals in many fields, both to generate new knowledge and to develop a qualified cadre of scientists who can provide an improved basis for risk assessment.

The EHS Center currently brings together and uses a variety of professional capabilities of research and teaching faculty, staff, and students from numerous OSU departments, schools, and colleges within OSU. Academic areas include chemistry, biochemistry and biophysics, environmental and molecular toxicology, microbiology, molecular and cell biology, food science and technology, fisheries and wildlife, veterinary medicine, pharmacology, zoology, and statistics. The center's visiting scientists program complements research expertise in these areas.

The broad mission of the EHS Center encompasses coordinated ongoing research of its faculty and encourages research by the training and support of qualified graduate students, predoctoral candidates, and postdoctoral research associates. As one of 26 national research centers designated by NIEHS, the EHS Center at OSU enhances the collaborative scientific research of its investigators with specialized core facilities. The center serves as an interdisciplinary resource on

human health as related to the environment; it periodically awards funding for pilot projects submitted by OSU faculty to encourage new approaches in environmental health research. Selected proposals receive funding for preliminary studies, many of which have led to agency funding as major projects. It sponsors conferences, symposia, seminars, and meetings for student training, faculty consultations, and public communication. The EHS Center, through the OSU Cooperative Extension Service and other existing mechanisms, has developed a Community Outreach and Education Program to communicate and heighten public awareness about environmental issues and the related recognition of risk to human health.

Examples of specific research areas include toxicology of environmental chemicals, cellular and biochemical toxicology, immunotoxicology, naturally occurring toxins, carcinogenesis of environmental chemicals, genetic toxicology, mass spectrometric ionization processes and methodologies, heteronuclear NMR studies, the chemical basis for solid waste and chemical waste disposal, and statistical studies, e.g., temporal aspects of cancer risks.

Federal environmental health legislation, particularly the Toxic Substances Control Act, has created a greater need for qualified toxicologists. To help meet this need, many EHS Center investigators serve as faculty within the OSU MS/PhD interdisciplinary graduate Toxicology Program, as well as being faculty for the ongoing predoctoral and postdoctoral training program supported by the NIEHS and administered by the center. The focus of the training and research in environmental toxicology emphasizes determination of the mode of action of environmental chemicals; the curricula encourage use of biochemical, pathological, and pharmacological approaches to acquire a mastery in aquatic, biochemical, comparative, environmental, food, as well as general toxicology.

The administrative office of the EHS Center is in the Agricultural and Life Sciences (ALS) building; the research and teaching facilities are in the cooperating departments on campus. The EHS Center office has information available upon request.

HATFIELD MARINE SCIENCE CENTER

Robert Cowen, Director

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The Hatfield Marine Science Center has more than 45 years of accomplishment in research, education, and outreach. Originally established as a marine laboratory for Oregon State University, it has grown to encompass a large group of partners on its 49-acre site on Yaquina Bay in Newport, Oregon. Within OSU, HMSC includes researchers, students, and faculty from six colleges. It serves as home to several university programs, including the Coastal Oregon Marine Experiment Station, the Cooperative Institute for Marine Resources Studies, and the Marine Mammal Institute. It also includes important components of the Oregon Sea Grant program and the Northwest National Marine Renewable Energy Center. Our onsite partners include six state and federal agencies involved in research and management of the marine environment, and our cooperation includes faculty appointments for agency staff, as well as opportunities for students to work with agency scientists. We work closely with local coastal communities, including the fishing industry. HMSC's Visitor Center is a key site for public education.

The dynamic nature of HMSC's programs is reflected in our mission statement:

The Hatfield Marine Science Center is Oregon State University's campus for research, education, and outreach in marine and coastal sciences. Through its partnerships, HMSC improves scientific understanding of marine systems, coastal processes and resources, and applies this knowledge to social, economic, and environmental issues.

HMSC brings OSU's diverse marine science programs together for effective collaboration and higher national and international visibility. The center plays an integral role in marine and estuarine research and instruction, as a unique laboratory facility serving resident scientists and students, and as a base for oceanographic research. With a combined budget in excess of \$45M, HMSC also plays an important economic role on the Oregon Coast.

Research facilities on the HMSC campus serve students and staff of OSU, partnering state and federal agencies, and visiting scientists from other institutions. Main buildings provide 200,000 square feet of office, library, classroom, wet and dry laboratory space and a Visitor

Center. Ship support facilities and dock areas of the College of Earth, Ocean, and Atmospheric Sciences serve the *R/V Oceanus*, *R/V Elakha*, *R/V Pacific Storm* and other research vessels. There are also housing and kitchen facilities for up to 82 students and visiting scientists on the HMSC campus.

The university encourages all marine science research, instruction, or extension activities to take advantage of the center's unique facilities.

Partners represented on the HMSC campus in Newport, Oregon:

- National Oceanic and Atmospheric Administration (NOAA)
 - Northwest Fisheries Science Center
 - Alaska Fisheries Science Center
 - Pacific Marine Environmental Laboratory
- US Environmental Protection Agency
- US Fish and Wildlife Service
- US Geological Survey
- USDA Agricultural Research Service
- Oregon Department of Fish and Wildlife
- Oregon State University
 - College of Agricultural Sciences
 - College of Education
 - College of Engineering
 - College of Forestry
 - College of Earth, Ocean, and Atmospheric Sciences
 - College of Science
 - College of Veterinary Medicine
 - Extension Service and Oregon Sea Grant
- Coastal Oregon Marine Experiment Station
- Cooperative Institute for Marine Resources Studies
- Marine Mammal Institute
- Northwest National Renewable Energy Center (NNMREC)

INSTITUTE FOR NATURAL RESOURCES

Lisa Gaines, Interim Director

Main Office: 541-737-9918

Website: <http://oregonstate.edu/inr>

Created by the Oregon Legislature with the Oregon Sustainability Act of 2001, the Institute for Natural Resources (INR) is a cooperative enterprise bringing the scientific knowledge and expertise of the Oregon University System and other Oregon higher education institutions to bear on natural resource management.

Designated as the lead university to administer INR, Oregon State University (OSU) established INR as a research institute within OSU to help decision-makers identify and use relevant science in making policy choices. At INR's foundation is the land grant mission — building bridges between theory and practice and effectively communicating knowledge to

decision-makers. As such, INR seeks to:

- provide Oregonians with ready access to current, science-based information and methods for better understanding and making informed decisions about our natural resource management challenges;
- increase the utility of integrated, science-based information in the development and understanding of natural resource and environmental policy by bridging science and decision-making efforts;
- focus on interdisciplinary natural resource and environmental problems and develop new collaborative relationships to solve them;
- identify and investigate controversial natural resource issues that challenge resource management and/or governance; and,
- identify opportunities for applied policy-related research that benefits Oregon's natural resources and environment.

INR's success depends upon a clear sense of our values and principles: ensuring integrity and objectivity, building partnerships, maintaining relevance, providing service, and creating excellence.

INR's focus areas, programs, and projects address Oregon natural resource issues in the local, regional, national, and international context.

INSTITUTE FOR WATER AND WATERSHEDS

Todd Jarvis, *Interim Director*

Kathryn Motter, *Laboratory Manager*
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Oregonians are beginning to witness the difficulties caused by water quantity and quality constraints and face critical choices about fresh water. Earlier melting of the Cascades snowpack is changing "free water storage," which has implications for snowmelt out of phase with existing water resource systems and ecosystems. Sustainable water supplies for development, ecosystem maintenance, and hydroelectric power generation may be adversely affected by increased population, climate change, and renegotiation of the Columbia River Treaty. Since water is "virtually" embedded in all Oregon products, whether natural or manufactured, the state's economic vitality is tied directly to water. Water quantity and quality issues in the Willamette and Klamath Basins are two of the state's top environmental priorities.

The aforementioned challenges are on an unprecedented scale and require solutions obtained by integrating several

or more disciplines. The Institute for Water and Watersheds (IWW), Oregon's federally-designated water resources research institute, has over 125 affiliated faculty and pursues solutions to Oregon's water problems by assembling research teams from a broad spectrum of disciplines. The institute utilizes educational and outreach models to communicate the latest water science and policy options to stakeholders so that they can make informed, intelligent decisions. The IWW's Water Collaboratory, an open analytical chemistry laboratory, provides faculty, staff, and students with a variety of analytical capabilities.

LABORATORY ANIMAL RESOURCES CENTER

Helen E. Diggs, MEd, DVM, DACLAM
Director and Campus Attending Veterinarian

101 Laboratory Animal Resources Center
Corvallis, Oregon 97331
541-737-6213

Email: larc@oregonstate.edu
Website: <http://www.oregonstate.edu/dept/larc>

The Laboratory Animal Resources Center (LARC) supports and manages the care and veterinary oversight of vertebrate animals used in instruction, research, and testing on the Oregon State University campus.

As the leading public research university in Oregon, the campus community is held to the highest standards for conducting responsible animal research. The LARC is managed and operated in compliance with the U.S. Public Health Service (PHS) Policy on Humane Care and Use of Laboratory Animals and the United States Department of Agriculture (USDA) Animal Welfare Act Regulations. The university is fully accredited by the Association for Assessment and Accreditation of Laboratory Animal Care, International (AAALAC). All LARC policies and procedures adhere firmly to the recommendations of the Guide for the Care and Use of Laboratory Animals (NRC 2011) and the Guide for the Care and Use of Agricultural Animals in Research and Teaching (FASS 2010).

The LARC staff is composed of animal care technicians, veterinarians, and veterinary technicians with specialty training and certifications specific to laboratory animal medicine and care. LARC employees are committed to providing an exemplary animal care and use program. This includes assuring humane care and use of animals through quality veterinary oversight, husbandry, social housing and environmental enrichment; facilitating campus research and instructional programs through collaboration, consultation, training, and provision

of professional technical and clinical services; maintaining compliance with applicable federal and state regulations, and upholding the university's academic mission, research agenda and commitment to public service.

LINUS PAULING INSTITUTE

Balz Frei, *Director*
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The Linus Pauling Institute was co-founded in 1973 by Linus Pauling, the only individual to win two unshared Nobel Prizes (Chemistry, 1954; Peace, 1962). The institute moved to the campus of Oregon State University (Dr. Pauling's undergraduate *alma mater*) in 1996 and now operates as one of the university's research centers and institutes. The program is principally supported by gifts from individuals, private corporations, and foundations; grants from federal and private agencies; and Oregon State University.

The basic premise that an optimum diet is the key to optimum health is the foundation of the Linus Pauling Institute. Researchers investigate the function and role of vitamins and essential minerals (micronutrients) and phytochemicals (chemicals from plants) in promoting health and preventing disease throughout life. They also study the role of oxidative stress and inflammation in disease and the protective effect of dietary antioxidants and anti-inflammatory compounds.

LPI's research is organized into three major areas: Cardiovascular and Metabolic Diseases, the Healthy Aging Program, and the Cancer Chemoprotection Program. Specific research projects address:

- Dietary antioxidants, vascular inflammation, and heart disease
- Vitamin E in human health
- Metabolism of dietary and endogenous fats
- Vitamin C, lipid peroxidation, and oxidative stress
- Role of lipoic acid in vascular inflammation and atherosclerosis
- Aging, stress response, and mitochondrial decay
- Lou Gehrig's disease (ALS), peroxynitrite, and superoxide dismutase
- Vitamin D and immune function
- Aging and memory
- Rapamycin, protein homeostasis, and aging
- Cancer chemoprotection for the fetus and infant
- Zinc and antioxidants in cancer chemoprevention
- Dietary interventions for cancer prevention

- Role of drug-metabolizing enzymes in health and disease
- Vitamin E metabolism and mechanisms for chemoprotection and chemotherapy

The goals of these studies are to understand the mechanisms by which nutrition affects disease initiation and progression and how nutritional factors can be used in the prevention and treatment of diseases. Such an understanding will allow an increase in the human health span — the period in which people enjoy a healthy and productive life, full of vitality, with minimal suffering, and free of cancer and other debilitating diseases.

LPI maintains three core laboratories that provide analytical services to intramural and extramural researchers:

- **Cancer Chemoprotection Program Core Laboratory**
The Cancer Chemoprotection Program (CCP) Core Laboratory provides genetic toxicology testing services. Its mission is to help investigators identify dietary compounds with chemoprotective properties and to elucidate their inhibitory mechanism(s). Several techniques, including the *Salmonella* mutagenicity assay (Ames test), single-cell gel electrophoresis assay (Comet assay), and micronucleus assay, enable investigators to assess the mutagenic, DNA-damaging, and clastogenic effects of chemicals. Using known mutagens or clastogens as positive controls, we study the potential beneficial activities of dietary compounds or other chemicals against those DNA-damaging agents. We also recently implemented a Histone Deacetylase (HDAC) assay to identify dietary HDAC inhibitors, which are of interest in cancer chemoprotection.
- **Oxidative/Nitrative Stress Core Laboratory**
Oxidative and nitrative stress can be produced by inflammation, disease, or environmental exposure, including tobacco smoke. The resulting reactive oxygen and nitrogen species can react with lipids, proteins, and nucleic acids in the body to form molecules measurable by sensitive chemical analytical methods. These molecules can serve as “biomarkers” to reveal an individual’s state of health or the effectiveness of dietary or pharmaceutical interventions. For example, F₂-isoprostanes and their metabolites are considered good biomarkers of free radical-induced lipid peroxidation. The Oxidative/Nitrative Stress Core Laboratory (ONSL) has several high-performance liquid chromatographs (HPLCs)

coupled to UV, fluorescence, electrochemical, and single- and triple-quadrupole mass spectrometer detectors. ONSL also has several solid-phase extraction robots for sample preparation. These facilities provide LPI investigators with state-of-the-art chemical analysis of biomarkers, antioxidants, and drug metabolites.

- **Food Composition Laboratory**
The Food Composition Laboratory provides chemical analyses of food composition and nutritional factors. We provide analyses of food, feed, or dietary supplement samples for vitamins, phytochemicals, and other compositional factors.

In addition to our research, we publish a free, semiannual research newsletter; maintain a website; provide peer-reviewed information about nutritional factors on our online Micronutrient Information Center, <http://lpi.oregonstate.edu/infocenter/>; organize and sponsor scientific meetings, including the biennial Diet and Optimum Health Conference; and respond to inquiries from the public and the media as our means of building on Dr. Pauling’s legacy. The Healthy Youth Program (<http://lpi.oregonstate.edu/healthyyouth>) is designed to provide education and activities on diet and exercise to school children and their teachers and families to promote optimum health.

NATIVE AMERICAN COLLABORATIVE INSTITUTE (NACI)

The Native American Collaborative Institute provides a means for Oregon Tribes and Oregon State University to fulfill the land, sea, and space grant mission to serve Oregon Native Americans as well as all citizens. The institute facilitates collaboration between tribal business, economic, natural resource, cultural resource, and education programs and Oregon State University faculty and staff, to identify areas of research, education, and outreach that will affect the quality of life of tribal peoples. The collaborations will be based on concepts of respect, relevancy, responsibility and reciprocity, and will:

- develop research and disseminate findings that provide policy makers with trustworthy information regarding tribal concerns
- act as a clearinghouse for information and access to issues of concern to Oregon Tribes
- create reciprocal agreements that increase Oregon Tribes access to Oregon State University research, education, and outreach efforts, and

communicate tribal perspectives that enable OSU to better respond to tribal needs, in a manner respecting cultural values

- facilitate tribal and Oregon State University access to funding from private foundations and public sources available through tribal and Oregon State University collaboration
- provide student, faculty and program staff internships on a reciprocal basis to further knowledge and understanding about topics of importance to both Oregon Tribes and Oregon State University.

NACI will develop a database of the research and extension needs of Oregon tribes, to develop and formalize productive methods of exchange between Oregon tribes and OSU, to identify potential sources of other, long term funding, and to build communications resources to approach these potential sources. Specifically, these projects will:

- invite the Oregon tribes to share their strategic plans and use this information to build a searchable data base of the possible research and extension service needs of tribes
- make on-site visits to Oregon tribes to discuss the tribes’ possible research and extension service needs with tribal leadership
- assemble Oregon tribal leadership with OSU college and research unit leadership to develop procedures and roles to be played by an NACI Advisory Council
- use IRIS and other data bases to compile information on potential funding sources, including the parameters of these sources’ funding decisions, areas of special interest, past funded projects, contact names, and deadline.

NORTHWEST NATIONAL MARINE RENEWABLE ENERGY CENTER

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The Northwest National Marine Renewable Energy Center (NNMREC) is a U.S. Department of Energy-sponsored partnership between Oregon State University (OSU) and the University of Washington (UW). OSU primarily investigates wave energy, UW investigates tidal energy, and

the two universities collaborate together with national laboratories on research, education, outreach, and engagement.

NNMREC's mission is to facilitate commercialization of marine energy technology, inform regulatory and policy decisions, and close key gaps in scientific understanding with a focus on student growth and development. We work closely with a variety of stakeholders, including device developers, community members, ocean users, federal and state regulators, and government officials, to conduct research about wave energy, provide test sites for prototype devices, and assist developers with planning and permitting activities.

NNMREC's objectives are to:

- Develop facilities to serve as an integrated, standardized test center for U.S. and international developers of wave and tidal energy;
- Evaluate potential environmental, ecosystem, and human dimension impacts, focusing on the compatibility of marine energy technologies in areas with sensitive environments and existing users;
- Facilitate and conduct research to inform adaptive management of marine energy technologies;
- Study and consult on device and array optimization for effective deployment of wave and tidal energy technologies;
- Improve forecasting of the wave energy resource; and
- Increase reliability and survivability of marine energy systems.

OREGON NASA SPACE GRANT CONSORTIUM

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The National Aeronautics and Space Administration (NASA) established Oregon Space Grant in 1991 as a part of the National Space Grant College and Fellowship Program. The objectives of the program are to establish a national network of universities with interest and capabilities in aeronautics, space, and related fields; encourage cooperative programs among universities, aerospace industry, and federal, state, and local governments; encourage interdisciplinary training, research, and public service programs related to aeronautics, space science, and technology; recruit and train professionals, especially women, underrepresented minorities, and persons with disabilities, for careers in aerospace-related science and engineering; and develop a strong science mathematics,

and technology education base from elementary through university levels.

Oregon NASA Space Grant maintains a diverse array of programs to support space science and engineering education. Connecting educators with professional development opportunities, Oregon Space Grant aims to help develop a strong science, mathematics, and technology education base at all levels while fostering communication and continuity between the K–12 community and higher education. Through various research award programs available to students and faculty, Oregon Space Grant supports STEM education and development within the higher education community. Undergraduate scholarships are available for students at affiliate campuses statewide. Participation in a wide array of internship programs administered by the Oregon Space Grant offers undergraduate and graduate level students opportunities to develop research skills while conducting hands-on projects at NASA centers nationwide. Additionally, graduate fellowships attract excellent students to aerospace related research programs at affiliate institutions across Oregon.

OREGON SEA GRANT

George R. (Rich) Holdren, *Interim Director*

Website: <http://seagrant.oregonstate.edu/>

Oregon Sea Grant's mission is to develop and support an integrated program of research, outreach, and education that helps people understand, rationally use, and conserve marine and coastal resources. Our activities respond to the needs of ocean users and act to stimulate the Oregon economy.

Funding for Sea Grant comes from federal and state appropriations as well as contributions from local governments and industry. The major support is a grant from the National Oceanic and Atmospheric Administration.

Program activities are conducted in several interdependent and critical topical areas including healthy coastal ecosystems; sustainable fisheries and aquaculture; resilient communities and economies; and environmental literacy and workforce development.

Oregon Sea Grant's very competitive grants program addresses issues of high importance and potential benefit to society and places priority on prediction (rather than explanation) and meaningful collaboration with industry, agencies, communities, and other stakeholders. In addition, Sea Grant supports undergraduate and graduate students as Sea Grant Scholars to study important marine and coastal problems.

Everything the program does, finally, is driven by an ethic of public service,

and the program uses various approaches to engage our constituents. An advisory council of coastal community leaders provides external review and counsel to the program. Interactions with a wide range of coastal stakeholders are continuous. The Sea Grant Extension program offers professional, technical, and public education. Free-choice learning and education faculty and staff provide educational opportunities for school-age through adult learners. Oregon Sea Grant communication faculty and staff work collaboratively with program Extension faculty and educators to engage, inform, and assist a range of stakeholders with research-based information, using print, digital, and electronic media.

Sea Grant manages the Visitor Center of the Hatfield Marine Science Center as a public science learning facility and laboratory for studying how people learn in such settings.

Multidisciplinary and interdisciplinary in operation, the program involves faculty and students in several Oregon institutions of higher education. Recent participants in the program also include the University of Oregon, Oregon Health and Science University, Portland State University, and Western Oregon University. In addition, Oregon Sea Grant maintains close relationships with several research facilities on the Oregon coast: the OSU Seafood Laboratory in Astoria, the Hatfield Marine Science Center in Newport, and the Oregon Institute of Marine Biology in Charleston.

RADIATION CENTER

Steve Reese, *Director*

Website: <http://radiationcenter.oregonstate.edu/>

The Radiation Center is a campus-wide instructional and research facility especially designed to accommodate programs involving the use of radiation and radioactive materials. Located in the center are major items of specialized equipment and unique teaching and research facilities, including a TRIGA Mark II nuclear research reactor (licensed to operate at 1,100 kilowatts when running at a steady power level and at 2,500 megawatts in the pulsing mode); a cobalt-60 gamma irradiator; a number of gamma radiation spectrometers and associated germanium detectors; and a variety of instruments for radiation measurements and monitoring. Facilities for radiation work include teaching and research laboratories with up-to-date instrumentation and related equipment for performing neutron activation analysis and radiotracer studies; laboratories for plant experiments involving radioactivity; an instrument calibration facility for radiation protection instrumentation;

and facilities for packaging radioactive materials for shipment to national and international destinations.

The Radiation Center staff is available to provide a wide variety of services including instruction and/or consultation associated with the feasibility, design, and execution of experiments using radiation and radioactive materials, and with safety evaluations relating to experiments or devices involving the use of radioisotopes or other radiation sources. In addition, the center provides direct support and assistance to teaching and research programs involving nuclear engineering, nuclear and radiation chemistry, radiation health physics, neutron activation analysis, neutron radiography, radiation effects on biological systems, radiation dosimetry, production of short-lived radioisotopes, radiation shielding, nuclear instrumentation, emergency response, transportation of radioactive materials, instrument calibration, and radioactive waste disposal.

The center's laboratories and instruments are available to all campus instructional and research programs requiring such support. The center also accommodates instructional and nuclear research and development programs requested by other universities, by federal and state agencies, and by industrial organizations. In addition, a special neutron activation analysis service for forensic studies is available to law enforcement agencies.

SUPERFUND RESEARCH CENTER

Dave Williams, *Director*

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Website: <http://oregonstate.edu/superfund/>

The Superfund Research Center oversees the NIEHS-funded Superfund Research Program grant at Oregon State University. This grant supports a multidisciplinary research effort to address the re-emerging health threat of polycyclic aromatic hydrocarbons (PAHs) in the environment. PAHs are considered a re-emerging threat to environmental health due to the increased burning of fossil fuels (e.g., coal and petroleum products) for energy production. The SRP grant supports five research projects and six support cores at Oregon State University and Pacific Northwest National Laboratory in Richland, WA, in a range of efforts involving human exposure to PAHs. In addition, research partners are located at San Diego State University, the Confederated Tribes of the Umatilla Indian Reservation and Pennsylvania State University. These research projects focus on determining the effect of PAHs on a variety of adverse human health outcomes employing

animal models such as zebrafish to detect developmental toxicities. An additional collaboration with Lawrence Livermore National Laboratories allows for following the fate of PAHs in humans as well as animals. Research efforts are also aimed at developing passive sampling devices to identify, measure and track PAHs in the atmosphere and foods to assess exposure of Native American populations to PAHs through wood smoke used in food preservation. Following the Deep Water Horizon oil spill, we were one of the first research groups to determine the levels of PAHs in the Gulf of Mexico at multiple sites over time. We partner with the U.S. EPA through the Partners in Technical Assistance Program to assist communities in dealing with concerns of environmental pollutants at Brownfields, Superfund sites or Conservation and Recovery Act sites. Support cores provide expertise in analytical chemistry, and in biostatistics and bioinformatics. The SRP grant also has programs aimed at translating research results to stakeholders and outreach to the public and in training the next generation of environmental health scientists.

SIGNATURE RESEARCH CENTERS

Nanoscience. Drug discovery. Sustainable "green" technologies. These are the focus of OSU's increasing collaboration with other Oregon research universities, the private sector, and state and federal agencies.

OREGON NANOSCIENCE AND MICROTECHNOLOGIES INSTITUTE (ONAMI)

Skip Rung, *President and Executive Director*

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ONAMI is Oregon's first "signature research center" for the purpose of sustaining and growing Oregon's innovation economy. As is true of only three other states, technology is Oregon's largest employer, with an average wage twice the statewide average. Growth of these kinds of job opportunities is the single most effective thing we can do for state financial health, schools, public safety and human services.

Our strategy has been 10 years in the making, and the selection of "nanoscience and microtechnologies" was based on a careful analysis intended to discover the largest possible intersection among:

- nationally competitive research in our universities,
- future commercial opportunities/growing sectors of the national

economy,

- the existing skills of Oregon industry and its surrounding value chain ecosystem.

ONAMI is now a nationally recognized model for state innovation initiatives, and is frequently featured at events and in publications by the National Science Foundation, National Governors Association, and other organizations concerned with keeping the United States competitive in the global innovation economy.

The state of Oregon so far has invested \$47 million in ONAMI, including \$5.2 million from the Oregon Innovation Council (OECD) for fiscal year 2012-2013. These funds are invested in OSU research and commercialization capacity in the form of matching funds for competitive extramural proposals, facility operations, and "gap" grants to assist in the formation of successful new products and startup companies.

ONAMI Staff and Leadership

ONAMI's leadership (executive director, research co-directors, 501c3 board) combines senior-level executive experience in both industry and academia.

President and Executive Director Robert D. "Skip" Rung worked for Hewlett-Packard for 25 years, most recently as director of Advanced Research and Development for HP's Corvallis, OR, facility, which is both the headquarters for HP's world-leading inkjet technology, as well as HP's most advanced and capable facility.

Working with Mr. Rung are **Vice President of Operations Cindy L. Dahl** (formerly area director for CH2M Hill), **High-Tech Extension Director Janet M. Teshima** (formerly Semiconductor Business VP for FEI Company), and **Gap Fund Manager Jay M. Lindquist** (formerly Corporate Development VP for FEI Company) and **Office Manager/Webmaster Danielle Z. Clair** (shared with the Microproducts Breakthrough Institute).

ONAMI Leadership Team Core Members:

Prof. Brian Paul, OSU/PNNL Microproducts Breakthrough Institute co-director. Dr. Paul is a professor of mechanical, industrial and manufacturing engineering at OSU, and a specialist in microfabrication technologies for MECS (Microtechnology-based Energy and Chemical Systems).

Prof. Goran Jovanovic, OSU/PNNL Microproducts Breakthrough Institute co-director. Dr. Jovanovic is a professor of chemical, biological and environmental engineering at OSU, and a specialist in chemical processes for fuel production, medical devices (e.g. hemodialysis filters) and many other applications.

Dr. Ward TeGrotenhuis, OSU/PNNL Microproducts Breakthrough

Institute co-director. Dr. TeGrotenhuis is a senior scientist and team leader for hydrocarbon processing at the Pacific Northwest National Laboratory.

Prof. Douglas Keszler, OSU Distinguished Professor of Chemistry and Principle Investigator for the NSF Center for Sustainable Materials Chemistry (CSMC), is a pioneer in the preparation and characterization of new solid-state inorganic materials. Current efforts are directed to the development and study of laser hosts, nonlinear optical materials, phosphors, transparent conductors, wide band-gap semiconductors, and low-temperature deposition and crystallization of thin films. Professor Keszler's pioneering work is the basis for Brilliant Technologies, Deep Photonics, Inpria and Amorphix all local start-up companies.

Prof. David Johnson, University of Oregon professor of chemistry and CSMC co-PI, is a solid-state chemist who has pioneered new method of synthesizing valuable new materials which cannot occur naturally. He is equally a pioneer in developing graduate student programs geared to the real career needs of students (most of whom will not become academics) and shared user facilities, which maximize the public value realized from investments in sophisticated equipment.

Dr. John Carruthers, Portland State University distinguished professor of physics, has worked at Bell Laboratories, NASA, Hewlett-Packard Laboratories, and most recently Intel Corporation, where he was director of components research and development at Intel's Hillsboro, OR, facility—the world's most advanced semiconductor facility, e.g. the first to achieve 32nm production on 300mm substrates, now poised to take the lead on sub-20nm technology in its recently announced D1X facility.

Prof. Jim Hutchison, University of Oregon professor of chemistry and UO Associate VP for Research, is a pioneer of green chemistry and leading innovator in nanofabrication and assembly processes that maximize material yields and minimize use and release of harmful reagents. Professor Hutchison is the leader of ONAMI's Safer Nanomaterials and Nanomanufacturing Initiative (SNNI), and also a founder of Dune Sciences, LLC.

ONAMI Inc. (501c3) board of directors members are senior executives from CH2MHill, Intel Corporation, Hewlett-Packard Company, FEI Company, Life Technologies Corporation, PNNL/Battelle, Sharp Laboratories, and all four of Oregon's major research universities. Ron Adams, dean of the College of Engineering at OSU, was formerly director of research and development at Tektronix' color printing operation (now Xerox), which is the world leader in solid inkjet

printing, and Xerox's most successful division.

Four Major Research and Commercialization Thrusts
Microtechnology-based energy and chemical systems ONAMI researchers are developing and fabricating unique bulk fluidic microsystems that accelerate, miniaturize and distribute energy, chemical and biomedical processes. Applications include:

- Compact, highest-performance heat exchangers
- Novel miniaturized HVAC cycles
- Medical devices, e.g. dialysis filters
- Fuel processing, e.g. hydrogen reforming
- Fuel atomization for small engines using greener fuels
- Continuous production and direct deposition of nanomaterials
- Water sterilization

This work is based on the principle that mass and heat transfer are best accomplished in microchannels which, when fabricated (typically via micro-lamination) into massively parallel structures, enable "bulk" throughputs without pressure drop penalties. Revolutionary results—in terms of component size, weight and energy efficiency—can be applied to military energy, medical devices and other specialty chemical products.

A dedicated facility, the Microproducts Breakthrough Institute (<http://mbi-online.org/>), supports project activity for research and development by both institutional researchers and numerous companies. A good overview of several applications and fabrication capabilities may be found at <http://mbi-online.org/our-research>.

Professors Goran Jovanovic, Brian Paul, and Kendra Sharp of Oregon State University and Dr. Ward TeGrotenhuis of the Pacific Northwest National Laboratory, jointly lead this team.

Nanoelectronics, Nanobiotechnology, and Nanometrology. ONAMI and Oregon's strong industrial and academic experience in semiconductor electronics, microscopy and microanalysis, analytical tools, and test and measurement, remains engaged on key semiconductor industry challenges (new devices, more demanding measurement challenges). They are also being leveraged to enable large opportunities and confront serious measurement challenges in the emerging field of nanomedicine (the application of engineered nanomaterials and nanoscale electronic, magnetic, and optical devices for medical diagnostics and therapeutics). The long history of equipment and instrumentation advances in the engineering and physical sciences, enabling great breakthroughs in the medical and life sciences, suggest that this is a very opportune time for the

physical, engineering and medical sciences to collaborate closely on developments in nanobiotechnology. Applications are emerging in single cell analysis at the point-of-use in real time for cancer and other disease diagnosis.

N3I research projects span the following areas:

Nanoelectronics

1. Carbon-based nanoelectronics
2. Analog memory applications of nanoscale devices
3. Nanoscale energy conversion and storage

Nanobiotechnology

1. Imaging/sensing/diagnostics at the nanoscale
2. Drug delivery/cell membrane behavior
3. Intracellular behavior and regenerative medicine

Nanometrology

1. Nanoscale optical near-field nanoscopy and photo-electron emission
2. Spatio-temporal-compositional imaging at the nanometer and femtosecond scales
3. Nanoscale electron crystallography
4. Nanoparticle characterization

Dr. John Carruthers, Distinguished Professor of Physics at Portland State University and former director of Components Research at Intel Corporation, heads up this research collaboration.

Safer Nanomaterials and Nanomanufacturing Initiative. The goals of ONAMI's Safer Nanomaterials and Nanomanufacturing Initiative (SNNI) are to develop new nanomaterials and nanomanufacturing approaches that offer a high level of performance, yet pose minimal harm to human health or the environment. Research under the initiative merges the principles of green chemistry and nanomaterials design and synthesis strategies to produce safer nanomaterials and more efficient nanomanufacturing (including critical purification steps) processes in the context of producing nanoparticles and nanostructured materials for applications in fields such as photovoltaics, nanoelectronics, and sensors.

In addition to greening the production of nanomaterials, SNNI seeks to understand the biological and environmental impacts of nanoparticles. As part of an international research community, it is [i] working with organizations to develop reference materials and standard practices, [ii] creating well-characterized nanomaterial libraries and [iii] developing effective methods protocols for both physico-chemical characterization and biological effects assays for many different types of engineered nanomaterials. Distinctive features of our research portfolio are the critical importance of using

only well-characterized nanomaterials and acquiring rich information sets from biological impacts studies. This approach establishes a foundation of fundamental knowledge and advances predictive strategies based upon structure-activity relationships. A long-term commitment to this strategy is required because it is simply not practical to test all significant permutations of nanoparticles (composition, size, shape, surface functionalization, etc.) in bioassays to assess safety.

Professor Jim Hutchison of the University of Oregon leads this initiative that is bringing together key scientists in the life sciences, materials sciences and engineering. Visit the Safer Nanomaterials and Nanomanufacturing website at <http://www.greennano.org>.

Since 2005, SNNI has spearheaded the highly regarded Greener Nano series of annual conferences, with "GN11" coming in the late spring of 2011: <http://www.greennano.org/GN11>.

Center for Sustainable Materials Chemistry. ONAMI member researchers and collaborators in both academia and industry are leading a growing collaboration in the study and design of environmentally benign chemistry platforms for the fabrication of high-performance inorganic electronic devices. Beginning from groundbreaking work on transparent electronics and atomic-precision synthesis using both low-temperature solution chemistry and gas-phase assembly techniques, the range of applications for these greener (i.e. benign and earth-abundant elements, lower cost fabrication methods) materials platforms includes many aspects of electronics manufacturing, optics, sensors, thermoelectrics, magnetics, coatings and metrology standards.

ONAMI researchers have recently demonstrated atomically dense and atomically smooth solution processed inorganic films, functionally graded materials from modulated elemental reactants, and a growing range of composite electronic materials.

This work has direct implications for:

- Nanoscale patterning for semiconductors and other applications
- High-performance thin film electronic elements, e.g. MIM electronics
- Printed electronics on non-traditional substrates
- Large area and lower cost display backplanes
- High-performance thermoelectric cooling
- Low cost thin-film photovoltaics

Learn more about the NSF Phase I Center for Sustainable Materials Chemistry at <http://sustainablematerialschemistry.com/>.

Professors Douglas Keszler at Oregon State University and David Johnson at

the University of Oregon lead this collaborative research initiative.

Facilities (NWNanoNet™)

Twenty million dollars of Oregon's initial investment in ONAMI and several million dollars in matching funds have been applied to three user facilities, which are open to all Oregon academic users on equal terms, and to industrial collaborators at commercially competitive rates. The open/shared facility model not only supports diverse research projects with advanced and well-maintained fabrication and characterization tools, it provides an essential resource to Oregon companies, the vast majority of which cannot afford to buy such capabilities for dedicated in-house usage.

Among the many users of the ONAMI-affiliated facilities are the ONAMI gap fund portfolio companies, which, led by Home Dialysis Plus, have raised over \$70 million in leveraged investment since late 2006.

The NWNanoNet™ facilities are:

The Microproducts Breakthrough Institute

(<http://mbi-online.org>) in Corvallis enables research and product development for microchannel devices and other microfluidics-related fields. Laser micromachining, nano-imprinting/hot embossing, microlamination, diffusion bonding, nano-particle injection micromolding, electroplating, atomic layer deposition, and high temperature sintering under precision loads are among the staple processes.

The **Center for Advanced Materials Characterization** (<http://camcor.uoregon.edu/>) in Eugene is the most capable university-based materials analysis and microscopy facility in the Pacific Northwest, offering user access and/or expert operator service for SEM (with e-beam lithography), HR-TEM, dual-beam FIB, Electron Microprobe, XRD, XPS, AFM, TOF-SIMS, UPS, FTIR, NMR, Mass Spec, and basic semiconductor device fabrication. CAMCOR serves clients all over the U.S.

The **Center for Electron Microscopy and Nanofabrication** (<http://www.pdx.edu/cemn/>) in downtown Portland has been home to one of the most advanced TEMs (200Kev) dual-beam FIBs in the Pacific Northwest. CEMN regularly serves over 40 companies in the silicon forest high-tech region centered around Portland, and also holds regular user training workshops.

The **OSU Electron Microscopy Facility** (<http://www.science.oregonstate.edu/emfacility/>) at Oregon State University. The Electron Microscopy Facility (EMF) provides service to the research community of both life sciences and materials science related studies. The facility was first established in the Department of Botany and Plant Pathology in 1967,

and has been in continuous operation. In addition to supporting faculty and students, the facility welcomes external academic and government institutions and industry. The facility maintains and operates the following instruments:

- FEI Quanta 3D Field Emission Dual Beam Scanning Electron Microscope (SEM/FIB)
- FEI Quanta 600F Field Emission Environmental SEM
- FEI Nova NanoSEM 230 High Resolution SEM
- FEI Titan 80-200/ChemSTEM Transmission Electron Microscope (TEM)

All microscopes are equipped with X-ray Energy Dispersive Spectrometers (EDS) to conduct chemical analysis. The OSU EMF is located in the Linus Pauling Science Center, room 145, 2900 SW Campus Way, Oregon State University, Corvallis, OR 97331.

Corporate Partners

ONAMI is uniquely situated in the midst of the world's most advanced collection of "small tech" research and development assets: Intel, Hewlett-Packard, FEI Company, CH2M Hill, ON Semiconductor Corp., Electro Scientific Industries, Xerox, Maxim, IDT, Sharp Labs, Microchip, Life Technologies/Invitrogen, Planar Systems, Wafertech, Flir, Mentor Graphics, Synopsys, Novellus, TriQuint, Siltronic, SEH America, Solarworld, Sanyo, Solaicx, Peak Sun Silicon and many exciting startup companies.

We have many opportunities to do joint research with nearby industries only a few minutes' drive away for research faculty and graduate students, and it is quite possible that highly capable corporate partners can be found to participate in new ONAMI federal projects.

OREGON TRANSLATIONAL RESEARCH AND DEVELOPMENT INSTITUTE (OTRADI)

Jennifer E. Fox, Executive Director
503-227-1814

Email: jfox@otradi.org

Website: <http://www.otradi.org>

About OTRADI

OTRADI is a nonprofit research and development organization, supported in part by the state of Oregon that strives to promote bioscience industry growth and job creation in Oregon. OTRADI achieves this goal via collaboration with private and public sector entities in the bioscience community to discover, develop, and commercialize therapeutics, vaccines, diagnostics and other life sciences products important for human health. OTRADI's specialized high-throughput drug discovery robotic equipment is

unique in the Northwest, offering previously out-of-reach drug screening capabilities as well as the expertise necessary to analyze results and quickly identify the best products to commercialize. OTRADI uses its equipment and expertise to rapidly screen thousands of chemical compounds developed by Oregon research laboratories and companies to identify new potential drugs, speeding progress on global health concerns, and bringing more economic development and scientific talent to Oregon.

A Unique Opportunity for Oregon Researchers

OTRADI brings the lab to the market via partnerships with Oregon universities, private bioscience companies, the life science industry, and public and private funders. Collaborating with OTRADI offers many advantages:

Collaboration

- OTRADI partners with university researchers and small biotech companies to help produce preliminary data in new areas and helps develop strategies and helps write grants.
- When grants are funded, OTRADI continues working with the investigator as a subcontractor on the grant.
- Investigators have access to opportunities for licensing and commercialization of novel chemicals and drug targets.

Training

- Researchers, faculty, postdocs and students
- Internships and fellowships

Expertise

- Experience and knowledge in assay development for cell biology, pharmacology, infectious diseases, cancer, inflammatory diseases, etc.

Specialized Equipment and Resources

- State-of-the-art drug discovery robotic equipment for high-throughput screening and high-content analysis
- Novel and commercially available chemical compound libraries comprised of more than 90,000 compounds for screening

Grant Partnering

- Actively involved in grant writing and attracting follow-on and new federal and private funding to Oregon universities and small businesses
- Supplied with the new experimental data that OTRADI produces, university researchers can provide federal granting agencies and/or pharmaceutical companies with the crucial evidence and support necessary (e.g., preliminary data)

to prove that their discoveries have increased value and worth as possible drugs, drug targets or diagnostic agents. OTRADI's activities have and will continue to increase federal grant funding success, spark small-business development in Oregon, foster student involvement in applicable research, accelerate connections between Oregon university researchers and biopharmaceutical companies and lead to the creation of high-paying jobs in Oregon.

How OTRADI Works

Every day, Oregon researchers make progress in the fields of biology, medicine, agriculture, marine biology and chemistry that may lead to promising new therapeutics or drug targets. While university researchers are experts within their own fields of science, they often lack the specialized scientific equipment and/or expertise necessary to translate their discoveries into potential new therapeutics. OTRADI brings the lab to the market by providing its partners with access to scientific expertise and equipment. It works to accelerate a product's development and commercialization through strategic partnerships and access to its wealth of resources. OTRADI forms the integral connection or "glue" that links the scientific with the commercial, energizing and simplifying the connection to move medical advances forward, and helping to translate scientific research into tomorrow's discoveries.

The OTRADI Bioscience Incubator

Operated by Oregon Translational Research and Development Institute (OTRADI), the OTRADI Bioscience Incubator (OBI) is the state's first and only bioscience-specific incubator. Located in Portland, Oregon, the multi-client company bioscience complex provides startups and scientists with access to entrepreneurial mentoring and state-of-the-art bioscience facilities, meeting space and shared equipment.

The OBI serves emerging companies and scientists who have outgrown existing space, but who want to dedicate resources to commercializing their research rather than investing in build-out and equipment. The OBI provides scientists with access to a state-of-the-art facility while their companies reach the next phase of expansion and growth.

How to Partner with OTRADI

Oregon university researchers and small businesses are encouraged to join OTRADI as OTRADI-Affiliated Researchers and Companies. As such, Affiliated Researchers are pre-qualified to collaborate with OTRADI and utilize our resources. Partnering with OTRADI provides researchers and Oregon companies access to unique expertise and drug-discovery equipment as well as assistance with

assay development, grant writing, business development, biomentoring and incubation. To learn more about OTRADI or the OTRADI Bioscience Incubator, see our website at <http://www.otradi.org> or contact OTRADI's Executive Director, Jennifer E. Fox, PhD, at jfox@otradi.org or 503-227-1814.

OREGON BEST

David Kenney, *President and Executive Director*

503-725-9849

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Website: <http://oregonbest.org>

Fueling Innovation and Commercialization for Oregon's Cleantech Economy

An economic development

catalyst, Oregon BEST is the nexus for clean technology innovation—building capability, convening collaborations, and accelerating solutions to environmental challenges that deliver prosperity to all corners of Oregon.

By connecting Oregon startup companies and existing businesses with a range of programs, university lab facilities, and research experts, Oregon BEST plays a key role in growing the state's clean technology economic sector. Fostering and supporting public-private collaborations, Oregon BEST sparks innovation that leads to cleantech solutions and commercialization of research—resulting in on-the-ground products, services, and jobs that power Oregon's economy.

Oregon BEST's work not only adds value and enhances competitiveness for Oregon businesses, it also grows the state's research revenue, expands research programs, enhances workforce development, and positions Oregon to recruit new cleantech companies.

Since its establishment as an independent, nonprofit organization by the Oregon Legislature in 2007, Oregon BEST's 230-plus Member Faculty have attracted more than \$100 million in research revenue to Oregon from federal, industry, and foundation sources. Building on Oregon's international reputation as a sustainability innovator, Oregon BEST offers a range of programs, expertise, and research facilities described below.

Oregon BEST Research Labs

Oregon BEST supports a statewide, university-based network of shared-user research labs worth millions of dollars that offers Oregon industry access to cutting-edge research tools, faculty expertise, and workforce development opportunities. This unique, distributed network of labs, managed by Oregon BEST Member Faculty, helps Oregon firms compete globally and Oregon universities grow research revenue and educational opportunities.

To date, Oregon BEST Labs includes the following facilities:

- SuNRISE Photovoltaics Laboratory at the University of Oregon
- Oregon Process Innovation Center (OPIC) for Sustainable Solar Cell Manufacturing at Oregon State University
- Green Building Research Laboratory at Portland State University
- Green Building Materials Laboratory—a 5,000 sq. ft. shared resource laboratory of Oregon Built Environment and Sustainable Technologies Center (Oregon BEST). Equipment for characterizing, developing and testing high performance sustainable materials for a wide variety of applications including buildings and transportation infrastructure. A new multi-chamber modular environment conditioning (MCMEC) system was added in 2014. The MCMEC is designed for durability testing of full-scale building assemblies. One test configuration allows exterior and interior conditions to be imposed simultaneously on an 8ft by 8ft wall, including sunlight simulation and water spray. The solar array operates in the range of 400 to 1200 W/m² over the 8ft by 8ft area. Temperature range is -30 to 40C and humidity range is 10 to 95%. Two full-size walls may be tested simultaneously.
- Energy Studies in Buildings Laboratory with locations at the University of Oregon in Eugene and in Portland
- infraStructure Testing and Applied Research (iSTAR) Laboratory at Portland State University
- High Performance Environments (HiPE) Lab at the University of Oregon

People throughout Oregon benefit from Oregon BEST Labs. These range from architects and construction firms engaged in sustainable built environment materials and design, to farmers and forest products companies producing biomass for clean fuels and bioproducts, to large and small companies generating solar, wind, geothermal, and wave energy. And many others.

Oregon BEST Researchers (Member Faculty)

A statewide network of 230+ Oregon BEST Researchers across four universities offer expertise and advice to industry to help Oregon companies—ranging from startups to existing firms—compete in the cleantech economy. The research expertise of Oregon BEST Researchers covers clean technologies of all kinds, as well as cleantech business expertise.

Oregon BEST Commercialization Program

This program accelerates the commercialization of technologies developed by universities and small businesses in Oregon. The program focuses on creating commercialization partnerships between industry and Oregon universities or leveraging existing collaborations between Oregon companies and Oregon BEST's Member Faculty.

The commercialization collaborations that are catalyzed by Oregon BEST create much-needed jobs for Oregonians in the cleantech sector, which is expected to experience significant growth for decades to come. Simultaneously, the technologies commercialized help address the challenges of climate change, our nation's dependence on fossil fuels, the environmental impacts of energy generation and building materials production, and the quality of our indoor environments.

The Commercialization Program has two main elements:

- **Oregon BEST Commercialization Grants** help bridge the gap between traditional R&D funding sources and the availability of private investment – a gap commonly known as the “valley of death.” By working with Oregon BEST Member Faculty at our partner universities, the university tech transfer offices, and small businesses, we identify opportunities for small investments to make a big impact in moving products and services to market and to achieving success in securing follow-on financing and initial customer traction.
- **Commercialization acceleration support services** connect experienced Entrepreneurs-in-Residence on the Oregon BEST team with researchers and startups that need assistance in making the transition from “technology readiness” to “investment readiness” and “commercial viability.” Oregon BEST provides consulting and mentorship to assist in the areas of business strategy, product strategy, acquisition of private capital, strategic business development, management team formation, and federal funding opportunities through the Oregon BEST SBIR/ STTR Support Center. Oregon BEST leverages the wide range of entrepreneur support services available from other entities and provides a focal point for the development of cleantech products and cleantech companies.

Oregon BEST Research Agenda Development Series

Oregon BEST convenes the ongoing Agenda Development Series to provide a forum and a venue where industry leaders collaboratively develop a prioritized research agenda. Expert presentations from practitioners frame the issues at each event, stimulating attendees in facilitated dialogues culminating in a set of research projects that Oregon BEST will publish and work to have funded. The resulting Research Agendas are published by Oregon BEST with attendees recognized as co-authors.

Proposal Matching Program

The Oregon BEST Proposal Matching Program assists Oregon BEST Member Faculty and research teams win competitive proposals for research grants/ contracts, research equipment acquisition, and product development/commercialization. The Oregon BEST matching funds provide support of activities that strengthen the competitiveness of proposals that might otherwise be difficult to fund. This program has leveraged more than \$17 million in new research dollars for the state.

Investment Opportunities: Oregon BEST Companies

Through a competitive process, Oregon BEST has awarded Commercialization Funding to more than 20 high-potential Oregon companies with strong technology, viable business strategies, and passionate entrepreneurs. Many of these Oregon BEST Companies are strong investment candidates for angel investors, venture capitalists and corporate strategic investors.

Visionary Leadership

Oregon BEST's leadership includes executives from some of the world's most respected sustainable built environment and renewable energy companies: SolarWorld, Portland General Electric, Gerding Edlen Development, CH2M HILL, Pacific Northwest National Laboratory, National Energy Technology Lab, and The Baker Group.

These executives join research leadership from Oregon BEST's founding partner universities (*see below*), venture capital and corporate investors, and members of the Oregon Legislature to make up a visionary Board of Directors, a Commercialization Advisory Board, and staff—all committed to advancing Oregon's cleantech economy.

History and Founding Universities

Oregon BEST was established as an independent, nonprofit organization in 2007 as part of the Oregon Innovation Council's legislative recommendations. Initial funding came from the Oregon Legislature, with additional support from the Oregon University System and the

Meyer Memorial Trust. Founding partner universities include the Oregon Institute of Technology, Oregon State University, Portland State University, and the University of Oregon.

ADDITIONAL RESEARCH UNITS AND CONSORTIA AT OSU

These additional research units are organized under OSU's colleges.

AGRICULTURAL EXPERIMENT STATION

Daniel J. Arp, *Director*

William G. Boggess, *Executive Associate Director*

Stella M. Coakley, *Associate Director*

Larry R. Curtis, *Associate Director*

John R. Talbott, *Assistant Director*

Jack Breen, *Agricultural Sciences and Marine Sciences Business Center Manager*
Email: AESsupport@oregonstate.edu
Website: <http://agsci.oregonstate.edu/research/>

The Oregon Agricultural Experiment Station is a statewide research network of Oregon State University scientists working on the Corvallis campus and at 11 branch stations in the major crop, climate, and marketing areas of Oregon. These diverse locations ensure that the station's research program is close to the people and the needs of Oregon's agricultural and natural resources. Founded July 1, 1888, in accordance with the federal Hatch Act of 1887, the mission of the Oregon Agricultural Experiment Station is to conduct research and demonstrations in the agricultural, biological, social, and environmental sciences that contribute to the economic, environmental, and social welfare of Oregon. We are committed to:

- Helping build a sustainable economy by fostering economic growth and sustainability;
- Addressing ecological concerns by generating knowledge and information to improve and protect Oregon's natural resources; and
- Expanding fundamental knowledge by advancing fundamental science relating to the environment, agriculture, and natural resources;
- Partnering with and enabling people and their communities to address a variety of issues including urban-rural economic dependencies, community food systems, land use, food security, poverty, and others

Current research emphases in the station are in five signature program

areas that sustain and build on the College of Agricultural Sciences' traditional strengths and link to stakeholder needs, but also look to key future opportunities. These signature areas also address contemporary and emerging forces or drivers facing Oregon's people and landscape. Overarching contemporary drivers comprise water, energy, climate change, health, and demographics. The signature program areas are:

- Sustainable food and agricultural systems;
- Environmental and human well-being;
- Plant sciences and systems biology;
- Natural resources stewardship;
- Bioproducts, biomaterials, and bioenergy for a sustainable bioeconomy.

The station conducts research in 12 academic departments (Applied Economics (formerly *Agricultural and Resource Economics*), Animal and Rangeland Sciences, Biological and Ecological Engineering, Botany and Plant Pathology, Chemistry, Crop and Soil Science, Environmental and Molecular Toxicology, Fisheries and Wildlife, Food Science and Technology, Horticulture, Microbiology, and Statistics), and colleges of Forestry, Public Health and Human Sciences, Science, and Veterinary Medicine. Research is supported in other units such as the Center for Genome Research and Bio-computing, Linus Pauling Institute, the Environmental Health Sciences Center, Agricultural Education and Agricultural Sciences, and Extension and Experiment Station Communications.

Branch stations provide opportunities for basic and applied field research programs at the following locations:

- Central Oregon Agricultural Research Center (Madras and Powell Butte)
- Columbia Basin Agricultural Research Center (Pendleton and Moro)
- Eastern Oregon Agricultural Research Center (Burns and Union)
- Food Innovation Center Experiment Station (Portland)
- Hermiston Agricultural Research and Extension Center (Hermiston)
- Klamath Basin Research and Extension Center (Klamath Falls)
- Malheur Experiment Station (Ontario)
- Mid-Columbia Agricultural Research and Extension Center (Hood River)
- North Willamette Research and Extension Center (Aurora)
- Southern Oregon Research and Extension Center (Medford)
- Coastal Oregon Marine Experiment Station (Newport and the Seafood Laboratory at Astoria)

The station collaborates with the OSU Extension Service, instructional programs within Oregon State University, Oregon

state agencies, federal departments of Agriculture, Commerce, Energy, Interior, and Transportation, and other federal and state agencies on research programs of interest to the state, the Pacific Northwest, the nation, and other countries.

ENGINEERING EXPERIMENT STATION

James R. Lundy, *Director*

Websites: <http://engineering.oregonstate.edu/research-centers-and-institutes>

By act of the Board of Regents of Oregon State College on May 4, 1927, the Engineering Experiment Station was established at Corvallis to serve the state in a manner broadly outlined by the following policy:

1. To serve the industries, utilities, professional engineers, public departments, and engineering teachers by making investigations of significance and interest to them.
2. To stimulate and elevate engineering education by developing the research spirit in faculty and students.
3. To publish and distribute through bulletins, circulars, and technical articles in periodicals the results of such studies, surveys, tests, investigations, and research as will be of greatest benefit to the people of Oregon, and particularly to the state's industries, utilities, and professional engineers.

The Engineering Experiment Station (also referred to as the Engineering Research Office) coordinates research in the College of Engineering. The associate dean of engineering is the director of the Engineering Experiment Station.

Research is conducted by faculty and students from the following schools:

- School of Chemical, Biological and Environmental Engineering
 - School of Civil and Construction Engineering
 - School of Electrical Engineering and Computer Science
 - School of Mechanical, Industrial and Manufacturing Engineering
- And the following departments:
- Department of Biological and Ecological Engineering
 - Department of Nuclear Engineering and Radiation Health Physics

Collaborative research is conducted in six research clusters:

Large Scale Energy Systems

Creating safer, super-efficient ways of generating energy to meet the world's growing demand—from harnessing the power of wind and waves to innovating new nuclear reactor designs.

Oregon Nanosciences and Microtechnology Institute at OSU

Putting nanotechnology to work in

micro systems for homeland security, clean and efficient energy systems, new medical devices, and the next generation of integrated circuits.

Biological and Environmental Systems

Employing Earth's smallest microorganisms in toxic waste cleanup and the development of more efficient manufacturing processes.

The Kiewit Center for Infrastructure and Transportation

Making the world's infrastructure safe, reliable, and efficient—from better tsunami warning systems to smarter transportation systems.

Information Systems

Making the world's vast amounts of information both easily accessible and highly useful—from more powerful Internet searches to more efficient databank management.

Mixed Signal Integration

Converting real-world signals like sound, light, and motion into digital data that computers can quickly process, resulting in technology breakthroughs that improve everything from communications to medicine.

FEED THE FUTURE INNOVATION LAB FOR COLLABORATIVE RESEARCH ON AQUACULTURE & FISHERIES (AQUAFISH INNOVATION LAB)

Hillary S. Egna, *Director*

Website: <http://aquafishcrsp.oregonstate.edu/>

The AquaFish Innovation Lab (formerly CRSP) is one of 10 Feed the Future Innovation Labs for Collaborative Research funded by the U.S. Agency for International Development (USAID) and participating U.S. and host country institutions. The mission of the AquaFish Innovation Lab is to enrich livelihoods and promote health by cultivating international multidisciplinary partnerships that advance science, research, education, and outreach in aquaculture and fisheries. Oregon State University leads this flagship program designed to reduce poverty in developing countries by improving access by the poor to fish and water resources. AquaFish research and outreach work focuses on developing comprehensive, sustainable, and economically viable aquaculture and fisheries management systems in developing countries that contribute to food safety and food security. Challenges poorer countries face include pressures from global trade, environmental degradation, climate change, water use conflicts, and the distribution

of benefits. The AquaFish Innovation Lab concentrates its efforts on reducing the number of constraints its host countries face in order to promote local economies. OSU partners with U.S. and host country universities, government, private companies, and non-governmental organizations to support research, development, and outreach activities in over 20 countries. AquaFish participating countries have included Bangladesh, Brazil, Cambodia, China, Ghana, Guyana, Honduras, Indonesia, Kenya, Mali, Mexico, Nicaragua, Nepal, Philippines, South Africa, Thailand, Tanzania, Uganda, Vietnam, and the U.S. The AquaFish Innovation Lab also has a grant to enhance the profitability of small aquaculture operations in Kenya, Ghana, and Tanzania, as part of the U.S. Government's new Feed the Future initiative.

FOREST RESEARCH LABORATORY

Thomas Maness, *Director*

Steve D. Tesch, *Associate Director*

Roger D. Admiral, *Associate Director*

Website: <http://www.cof.orst.edu/frl/>

The Forest Research Laboratory (FRL) is Oregon's research agency that helps solve problems, create opportunities, and develop new understanding and innovation about forest ecosystems, forest management and forest-derived renewable materials; its director is the dean of Oregon State University's College of Forestry. Established by the Oregon Legislature in 1941, the program is supported by state and federal appropriations and by research grants from public and private sources. In addition to research in campus laboratories and university forests, studies are conducted cooperatively in public and private forests and in laboratories and manufacturing facilities throughout Oregon and the world.

Faculty, staff, and students from the College of Forestry's departments of Forest Engineering, Resources, and Management; Forest Ecosystems and Society; and Wood Science and Engineering contribute to a diverse portfolio of fundamental and applied research and outreach activities. Activities benefit from collaboration with many other departments and colleges at Oregon State and elsewhere. Communication of results to science peers, land managers, policy makers, and the public is a high priority.

Faculty are providing leadership in addressing many of society's challenges at scales ranging from molecules to the globe, including topics such as:

- Supporting the economic and social viability of rural communities
- Determining the impacts of climate change on forests and how forests

can lessen the severity of change

- Protecting the sustainability of forests and the ecosystem services they provide, including water, wildlife habitat, recreation, and wood
- Facilitating development and use of renewable "green" materials and energy
- Fostering operations and manufacturing processes that are environmentally and socially acceptable, and economically feasible
- Expanding the understanding and value of forests to society, especially in urban environments

The laboratory's programs are designed to provide information that supports scientifically informed decisions about the management, conservation and use of Oregon's public and private forest resources, and to enhance the competitiveness of Oregon's forest-resource-based industries and businesses. Through its research and outreach education efforts, Oregon's forests produce more wood products, water, forage, fish, wildlife, and recreation; green materials such as wood are harvested and used more efficiently and innovatively; some forests are used more intensively while others are conserved more effectively; employment, production, and profitability in forest-resource-related businesses are strengthened; and assistance is provided in maintaining a quality environment for Oregonians.

The FRL, the Corvallis Forestry Sciences Laboratory of the U.S. Forest Service, the Corvallis-based Forest and Rangelands Ecosystem Science Center of the U.S. Geological Service, and related research conducted elsewhere on campus combine to form the largest concentration of forest sciences research in North America.

INTEGRATED PLANT PROTECTION CENTER

Paul Jepson, *Director*

Website: <http://www.ipmnet.org/>

The Integrated Plant Protection Center (IPPC) was established in 1991, to expand upon the range of activities of the International Plant Protection Center, that was chartered by Oregon State University in 1969 (see <http://www.ipmnet.org/>). The IPPC is partially supported by the Agricultural Experiment Station, and the Cooperative Extension Service. The IPPC focuses upon research, education and outreach activities associated with the adoption of sustainable integrated pest management (IPM) practices in agriculture. It is the home for a number United States Department of Agriculture (USDA)-funded programs associated with pest control and pesticide management, including the state IPM program,

the Regional Pest Management Center program, the Pesticide and Environmental Stewardship program, and the Farm Safety program.

The IPPC provides leadership, coordination and support for scientists at OSU, in the Pacific Northwest region, and internationally, in the field of IPM. Its activities encompass pest, disease and weed management, and the rational management and use of pesticides. It also provides news and facilitates communications between university, state, and federal agencies through a number of media, including an electronic news alert system, and a newsletter (see <http://oregonipm.ippc.orst.edu/>).

IPPC activities include the provision of electronic tools that assist growers and their advisors in making pest management decisions within their crops. This includes online weather data and degree-day models, which forecast the developmental stages and epidemiology of a number of important crops pests and diseases (see <http://pnwpest.org/wea/>). In addition, the IPPC works collaboratively with scientists throughout the state, to manage online pest alerts to growers. These can be accessed via the IPPC home page (see <http://www.ipmnet.org/>).

The IPPC maintains a large and important collection of documents, monographs and books on IPM, much of which is searchable via the OSU Valley library online database. It also supports a unique service in international outreach, IPMnet, which includes, among a number of other resources, IPMnet NEWS, a monthly electronic newsletter that is distributed to scientists in 127 countries (see <http://www.ipmnet.org/>). IPMnet NEWS is supported by the Consortium for International Crop Protection (CICP) and a grant from the USDA.

The IPPC is expanding its activities in four areas at present, (1) biological control/biologically-based pest management, (2) enhanced diagnostic and forecasting tools, (3) pesticide management, rational use, risk mitigation and (4) information delivery, decision support and outreach. For further details please contact the director.

INTER-UNIVERSITY CONSORTIUM FOR POLITICAL AND SOCIAL RESEARCH (ICPSR)

Valery King, *Official Representative (OSU Libraries)*

Amanda Whitmire, *Designated Representative (OSU Libraries)*
Website: <http://www.icpsr.umich.edu/icpsrweb/ICPSR/>

Through funding provided by OSU Libraries, Oregon State University is a member of ICPSR, the Inter-University Consortium for Political and Social Research. A unit within the Institute for Social Research at the University of Michigan, ICPSR was established in 1962 and maintains and provides access to a vast archive of social science data for research and instruction. OSU students, faculty and staff may access these data at no charge and may also deposit their own data into the collection.

ICPSR offers members reduced fees to attend the *Summer Training Program in Quantitative Methods of Social Research*, a comprehensive curriculum of intensive courses in research design, statistics, data analysis, and social methodology. Additionally ICPSR leads several initiatives that encourage use of data in teaching, particularly for undergraduate instruction, and offers user support to assist researchers in identifying relevant data for analysis and in conducting their research projects.

KIEWIT CENTER FOR INFRASTRUCTURE AND TRANSPORTATION

Scott Ashford, *Director*

Email: kiewit.center@oregonstate.edu
Website: <http://kiewit.oregonstate.edu/>

Background

The Kiewit Center for Infrastructure and Transportation was initially established in 1962 as the Transportation Research Institute. The Kiewit Center serves as the umbrella organization all research within the School of Civil and Construction Engineering. The center is a key component in the College of Engineering's drive to become a top 25 engineering program, coordinating multi- and interdisciplinary research projects.

For the last 150 years, civil engineers have built the infrastructure upon which American prosperity rests. Roads, bridges, aviation, dams, schools, and safe drinking water form the foundation for our quality of life. Today that foundation is crumbling. Americans experience this deterioration every day. A recent report by the American Society of Civil Engineers confirms what most Americans already

know—the ASCE report gave the U.S. infrastructure an overall grade of D+.

The center is an interdisciplinary unit that provides research, education and public service related to the built environment and the systems that operate in that environment.

Facilities

- Geotechnical Testing Laboratory
 - Testing in support of both practice-oriented investigations and state-of-the-art research
 - Advanced geo-mechanical modeling of soil-structure interaction
 - Full scale, well-instrumented testing of field geo-systems
- Highway Materials Laboratory
 - Investigation of innovative highway construction materials
 - Evaluation of recycled materials for use in construction
- O.H. Hinsdale Wave Research Laboratory
 - Impact of tsunamis and storm waves on coastal infrastructure
 - Nearshore processes related to coastal erosion
 - Tsunami and coastal hazard mitigation
- Large Scale Structural Strong-Floor Facility
 - Structural evaluation of full size beams and columns
 - Development of earthquake resistant structural systems
- National Center for Accessible Transportation
 - Investigation of advanced technologies for accessible transportation systems

MICROPRODUCTS BREAKTHROUGH INSTITUTE

Goran Jovanovic, *OSU Co-Director*

541-713-1348 (office-MBI)
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Website: <http://mbi-online.org/>

The MBI is a 45,000 square foot facility located on the Hewlett-Packard Corvallis campus containing offices, laboratories, fabrication facilities and laydown space for the research, development and commercialization of arrayed microfluidic systems and related nanomanufacturing technology. This facility is focused on accelerating the discovery, development and commercial deployment of new nano- and micro-scale phenomena and their technology embodiments.

The MBI is collaboration between the Pacific Northwest National Laboratory (PNNL) and Oregon State University (OSU). The MBI is one of three shared-user facilities within the Oregon Nanoscience and Microtechnologies Institute (ONAMI, <http://www.onami.us/>).

PNNL and OSU are leaders in the science, engineering, and technology development of nano- and micro-scale processes and systems. Collaboratively they conduct research and development projects ranging from fundamental science and technology investigations to assistance with commercial development and production. Areas of current research and development include photovoltaic manufacturing, hydrogen storage, nanomaterials synthesis, biofuel processing, miniature heat pumps and artificial kidneys among others.

Both PNNL and OSU are well established in arrayed microfluidic systems development. PNNL's thrust is Micro Chemical and Thermal Systems (MICROCATS) while OSU concentrates on Micro Energy and Chemical Systems (MECS). Together, OSU and PNNL seek to model, through the MBI, the way in which technology can be developed and commercialized through the collaboration of federal laboratories and universities.

The MBI is performing research and development in arrayed microfluidics and nanomanufacturing for:

- U.S. Department of Energy (DOE)
- National Institute of Health (NIH)
- Defense Advanced Research Projects Agency (DARPA)
- U.S. Army
- National Aeronautics and Space Administration (NASA)
- National Science Foundation (NSF)
- Private companies and corporations

O.H. HINSDALE WAVE RESEARCH LABORATORY

David Trejo, *Interim Director*
541-737-9304

Email: david.trejo@oregonstate.edu
Website: <http://wave.oregonstate.edu/>

The O.H. Hinsdale Wave Research Laboratory, together with the Coastal and Ocean Engineering Program within the School of Civil and Construction Engineering, is a leading center for research and education in coastal engineering and nearshore science. Its strengths include:

- An active faculty specializing in physical, numerical, and theoretical modeling of coastal processes
- An interdisciplinary graduate program offering MS, ME and PhD degrees
- One of the largest and technically most advanced laboratories for coastal research
- Expertise in tsunami and coastal hazard mitigation

The O.H. Hinsdale Wave Research Laboratory is the largest experimental facility for coastal research at an academic institution in the U.S. The two-acre building is situated on the main campus and houses the Large Wave Flume (LWF),

Tsunami Wave Basin (TWB), and 2,000 sq. ft. of office space for staff, graduate students, visiting researchers, and clients. The HWRL is partially supported by the George E. Brown Jr. Network for Earthquake Engineering Simulation (NEES) consortium of the National Science Foundation. The laboratory conducts research on coastal and nearshore processes involving:

- Wave-structure interaction
- Nearshore hydrodynamics and sediment transport
- Wave energy
- Tsunami and coastal hazards
- Fixed and floating structures

The O.H. Hinsdale Wave Research Laboratory and the Coastal and Ocean Engineering Program are committed to providing outstanding education and research opportunities to reduce risks associated with coastal hazards and tsunamis, to improve the sustainability of coastal areas, and to develop innovative solutions to the design of coastal infrastructure.

OREGON CLIMATE CHANGE RESEARCH INSTITUTE (OCCRI)

Philip W. Mote, *Director*

Kathie Dello, *Associate Director, OCCRI*

Gustavo Bisbal, *Director, DOI PNW Climate Science Center*

Websites: <http://occri.net/> and <http://pnwclimate.org>

The Oregon State Legislature established the Oregon Climate Change Research Institute (OCCRI) within the Department of Higher Education in 2007. OCCRI is a network of over 150 researchers at Oregon State University (OSU), the University of Oregon, Portland State University, Southern Oregon University, and affiliated federal and state labs.

OCCRI is administered by OSU and its institutional partners within the Oregon University System (OUS).

OCCRI is tasked with:

- facilitating research by OUS faculty on climate change and its effects on natural and human systems in Oregon
- serving as a clearinghouse for climate change information
- providing climate change information to the public in integrated and accessible formats
- supporting the Oregon Global Warming Commission in developing strategies to prepare for and to mitigate the effects of climate change on natural and human systems, and
- providing technical assistance to local governments to assist them in developing climate change policies, practices, and programs.

At least every two years, the institute will also develop an assessment of climate change science as it relates to Oregon and the likely effects of climate change on the state. OCCRI helps Oregonians, government agencies, and the private sector understand the potential impacts of climate variability and change on the state. The institute also helps individuals, agencies, and companies develop new strategies to prepare for climate change.

In September of 2010, OCCRI was named as the anchor institution for two federally funded regional climate science centers. The Department of the Interior's (DOI) Pacific Northwest Climate Science Center (CSC) is one of eight planned CSC's. The CSC will serve as a resource for DOI agencies in providing necessary science in advising policy decisions. The National Oceanic and Atmospheric Administration's (NOAA) Pacific Northwest Climate Impacts Research Consortium (CIRC) is one of 11 Regional Integrated Sciences and Assessments (RISA) projects. The CIRC is engaging a broad number of stakeholders, including municipalities, utilities, emergency management organizations, irrigators, agricultural and Sea Grant extension, and state and federal agencies. In support of these stakeholders, CIRC is working on developing regional downscaled climate scenarios using integrated climate, hydrological, and vegetation models; PNW region and basin scale climate impacts assessments; social science and network analysis; coastal climate hazard, risk and vulnerability assessments; decision scenario visualization and planning tools; climate extension; public health risk management guidance; and community level adaptation approaches (see <http://pnwclimate.org>).

OREGON WOOD INNOVATION CENTER

Scott Leavengood, *Director*
541-737-4212

Chris Knowles, *Assistant Director*
541-737-1438

Kent Davis, *Undergraduate Student Research Project Coordinator*
541-737-4252
119 Richardson Hall
Corvallis, OR 97331-5751
Email: owic@oregonstate.edu
Website: <http://owic.oregonstate.edu/>

The Oregon Wood Innovation Center (OWIC) is a joint initiative of Oregon State University's College of Forestry and Extension Service. OWIC's mission is to improve the competitiveness of Oregon's wood products industry by fostering innovation in products, processes, and business systems. A key function of the

center is to serve as the primary link between university research and needs and opportunities in the forest industry.

Why an Innovation Center?

The forest products industry has undergone dramatic changes in recent years. The industry responded to reductions in raw material supply and the forces of globalization by consolidating, retooling production systems, and by focusing on improving efficiencies in manufacturing processes. However, it is clear that focusing solely on process innovation will be insufficient to maintain future competitive advantage. Firms must also focus on product and business systems innovation. OWIC helps foster such innovation by serving as a 'clearinghouse' to connect manufacturers to the research community, to other organizations that provide assistance to businesses, and to facilitate networking within the industry.

Facilities and Services

OWIC is housed within OSU's Department of Wood Science and Engineering, a department with established capabilities in research, outreach, and technology transfer in a broad array of disciplines. Disciplines and accompanying laboratories and services include:

- **Anatomy and Quality of Renewable Materials**—laboratories for wood fiber characterization and wood identification; equipment including microscopes and an X-ray densitometer.
- **Biodeterioration, Protection and Durability of Renewable Materials**—pressure cylinder for impregnating materials with preservatives; equipment for assessing insect and decay resistance.
- **Biomass and Biofuels**—equipment for analyzing the physical characteristics and energy value (e.g., particle size distribution, ash content and composition, and calorimetric heating values) of biomass feed stocks; a ½-meter diameter dryer for biomass.
- **Chemistry**—adhesives development, testing, and troubleshooting; research and testing of plant materials for value-added chemical products.
- **Nanotechnology**—research in nanocomposites for advanced textiles, barrier films, membranes, coatings and sensors
- **Composite Materials**—development and testing of wood and wood/non-wood composites; equipment including presses (hot and cold), glue spreader, refiner, digester, blender, former, and wood-plastic extruder.
- **Wood Drying**—a 100 BF kiln for measuring volatile organic

compound (VOC) emissions and 2,000 BF dry kiln for research in lumber drying.

- **Timber Engineering and Structural Design**—equipment for assessing strength properties of wood-based materials; scale varies from small specimens up to large members such as beams and full-scale wall systems.
- **Green Building Materials Laboratory**—a 5,000 sq. ft. shared resource laboratory of Oregon Built Environment and Sustainable Technologies Center (Oregon BEST). Equipment for characterizing, developing and testing high performance sustainable materials for a wide variety of applications including buildings and transportation infrastructure.
- **Forest Products Business and Marketing**—research and outreach on innovation in the forest industry and assessment of market potential for new products.
- **Environmental Impacts of Renewable Materials**—research on the environmental impacts of renewable materials from 'cradle to grave' (life cycle inventory and analysis).
- Other facilities include environmental conditioning chambers (hot-dry, hot-wet, cold room, standards room) and state-of-the-art classrooms for onsite or distance education programs.

SUN GRANT WESTERN REGIONAL CENTER

John R. Talbott, *Director*

541-737-2194

Email: john.talbott@oregonstate.edu

Email: sungrant@oregonstate.edu

Website: <http://sungrant.oregonstate.edu/>

The mission of the Sun Grant Initiative is to:

1. Enhance national energy security through development, distribution and implementation of biobased energy technologies;
2. Promote diversification in and the environmental sustainability of, agricultural production in the United States through biobased energy and products technologies;
3. Promote economic diversification in rural areas of the United States through biobased energy and product technologies; and
4. Enhance the efficiency of bioenergy and biomass research and development programs through improved coordination and collaboration among the Department of Agriculture, the Department of

Energy, and the land grant colleges and universities.

A network of five land grant universities serve as regional Sun Grant Centers. These universities include Oregon State University (Western Region), South Dakota State University (North-Central), Oklahoma State University (South-Central), the University of Tennessee-Knoxville (Southeastern), and Cornell University (Northeastern). The centers facilitate federally funded research, extension, and education programs in their respective regions.

The Sun Grant Western Regional Center, located at Oregon State University in Corvallis, is the administrative unit for the region composed of the states of Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, Utah, and Washington, and the Pacific Territories and associated Pacific island nations, including American Samoa, Commonwealth of the Northern Mariana Islands, Guam, Federated States of Micronesia, the Republic of Palau, and the Republic of the Marshall Islands.

The current program area priorities for the Western region include biomass production, conversion and processing technologies, the development and enhancement of bio-based products, and evaluation of the bioproduct supply chain and life cycle analyses.

Important aims for the center include distributed energy production, diversity of feedstocks and processing approaches, crop suitability assessment, co-product and local human capital development, and system approaches.

SURVEY RESEARCH CENTER

Virginia Lesser, *Director*

Website: <http://www.stat.oregonstate.edu/src>

The Survey Research Center, established in 1973, operates as a center for research in survey methodology, and to provide research support with regard to survey design, sample selection, questionnaire construction, data collection and reduction, statistical analysis, and the reporting of results.

The center is available to departments of the Oregon State System of Higher Education and to other organizations serving the public interest. Charges are made for all work in the center except preliminary consulting. Estimates for project proposals can be obtained upon request. For proposals to be submitted to funding agencies, the center can either submit a joint proposal or act as a subcontractor.

The center's interests include surveys of human populations, and other populations such as plants, animals, land areas, and other populations for which surveys can provide useful information.

**UNIVERSITY CORPORATION
FOR ATMOSPHERIC
RESEARCH (UCAR)**

Jeffrey R. Barnes, *OSU Member
Representatives*

Website: <https://www2.ucar.edu/>

Through its membership in this national research consortium, Oregon State University has access to extensive facilities and services in support of its research in atmospheric, oceanic, and related sciences. Chief among these is the National Center for Atmospheric Research (NCAR) in Boulder, Colorado. Under the support of the National Science Foundation, this national laboratory conducts significant programs of atmospheric, oceanographic, and solar research in cooperation with member universities, and operates a state-of-the-art super computer facility, which is accessible to member institutions. UCAR also operates facilities for scientific ballooning, and through NCAR, maintains instrumented research aircraft and an extensive research and data library.

In addition to using these facilities, OSU faculty and graduate students participate in numerous seminars, workshops, and scientific meetings and conferences that are held at NCAR throughout the year. Through the corporation, Oregon State also cooperates in various national and international initiatives for research, service, and training in the atmospheric and related sciences.

EMERITUS FACULTY

Emeritus status is given to eligible tenured Oregon State University faculty members upon their retirement, in recognition for their years of effective service. As leaders in their fields, many emeritus faculty members continue to serve the university throughout their retirement. The year listed after each name is the year the faculty member began service at Oregon State.

A

Abrassart, Arthur E 1966 Emeritus Associate Professor College of Business.
 Acock, Alan C 1990 Emeritus Professor Sch of Soc/Bhav Hlth Sci.
 Adair, John 1953 Emeritus Senior Instructor I Animal & Rnglnd Sciences.
 Adams, Darius M 1995 Emeritus Professor Forest Eng/Resources/Mgmt.
 Adams, David G 1972 Emeritus Professor Horticulture Extension.
 Adams, Frank W 1953 Emeritus Assistant Professor Enviro/Molecular Toxic.
 Adams, Richard M 1983 Emeritus Professor Applied Economics.
 Adams, Wesley 1978 Emeritus Professor Forest Ecosyst & Society.
 Ahearn, Kerry D 1976 Emeritus Associate Professor Sch of Wrtg Lit & Film.
 Aldrich-Markham, Susan 1983 Emeritus Professor Crop and Soil Science.
 Ali Niazee, Mohammed T 1972 Emeritus Professor Horticulture.
 Allen Jr, John S 1973 Emeritus Professor Earth, Ocean & Atmo Sci.
 Allen Jr, Thomas C 1962 Emeritus Professor Ag Botany/Plant Path.
 Amano, Matthew M 1967 Emeritus Professor College of Business.
 Amort, Donald L 1958 Emeritus Associate Professor Sch Elect Engr/Comp Sci.
 Andersen, Wilbert L 1969 Emeritus Professor Extension Service Prgram.
 Anderson, Norman H 1962 Emeritus Professor College of Science Admin.
 Anderson, Roberta C 1970 Emeritus Professor Extension Service Prgram.
 Anderson, Sonia R 1968 Emeritus Professor Biochem/Biophysics.
 Anselone, Philip M 1964 Emeritus Professor Mathematics.
 Appleby, Arnold P 1959 Emeritus Professor Crop and Soil Science.
 Armstrong, Donald J 1974 Emeritus Professor Ag Botany/Plant Path.
 Arnold, Roy G 1987 Emeritus Professor Food Science and Techno.
 Arnold, Roy G 1987 Provost Emeritus Provost/Exec Vice Pres.
 Arscott, George H 1953 Emeritus Professor Animal & Rnglnd Sciences.
 Arthur, Jeffrey L 1977 Emeritus Professor Statistics (Science).
 Arthur Jr, John R 1983 Emeritus Professor Sch Elect Engr/Comp Sci.

Atkinson, William A 1987 Emeritus Professor Forest Eng/Resources/Mgmt.
 Ayres, James W 1970 Emeritus Professor Pharmacy.

B

Baggett, James R 1956 Emeritus Professor Horticulture.
 Bailes, Jack C 1972 Emeritus Professor College of Business.
 Bailey, George S 1979 Emeritus Professor Enviro/Molecular Toxic.
 Baisted, Derek J 1963 Emeritus Professor Biochem/Biophysics.
 Ball, Daniel A 1991 Emeritus Professor Crop and Soil Science.
 Barofsky, Douglas F 1984 Emeritus Professor Chemistry.
 Barte, Georgene V 1961 Emeritus Associate Professor Sch of Bio/Pop Hlth Sci.
 Bayne, Christopher J 1970 Emeritus Professor Zoology.
 Beatty, Joseph J 1974 Emeritus Senior Instructor I Zoology.
 Becker, Boris W 1970 Emeritus Professor College of Business.
 Becker, Gerald L 1968 Emeritus Associate Professor College of Education.
 Becker, Robert R 1962 Emeritus Professor Biochem/Biophysics.
 Bell, J R 1962 Emeritus Professor Sch of Civil/Constr Engr.
 Bell, John F 1959 Emeritus Professor Forest Eng/Resources/Mgmt.
 Bella, David A 1967 Emeritus Professor Sch of Civil/Constr Engr.
 Bengtson, George W 1979 Emeritus Professor College of Forestry Adm.
 Bennett, Andrew F 1987 Emeritus Professor Earth, Ocean & Atmo Sci.
 Bennett Jr, Cleon V 1959 Emeritus Professor Speech Communication.
 Beran, Kurt 1975 Emeritus Assistant Professor College of Business.
 Bergeron, D J 1974 Emeritus Associate Professor Fisheries and Wildlife.
 Berry, Ralph E 1968 Emeritus Professor Ag Botany/Plant Path.
 Beschta, Robert L 1974 Emeritus Professor Forest Ecosyst & Society.
 Besse Jr, Ralph S 1963 Emeritus Professor Earth, Ocean & Atmo Sci.
 Binney, Stephen E 1973 Emeritus Professor Nuclear Engineering.
 Birkes, David 1972 Emeritus Associate Professor Statistics (Science).
 Bishop, Norman I 1963 Emeritus Professor Ag Botany/Plant Path.
 Black, Harold M 1962 Emeritus Professor Extension Service Prgram.
 Block, John H 1966 Emeritus Professor Pharmacy.
 Bloome, Peter D 1997 Emeritus Professor Biol & Ecol Engineering.
 Bluhm, Wilbur L 1957 Emeritus Professor Extension Service Prgram.
 Bodyfelt, Floyd W 1964 Emeritus Professor Food Sci/Tech Extension.
 Boedtker, Olaf A 1961 Emeritus Associate Professor Physics.
 Boehlert, George W 2002 Emeritus Professor Fisheries and Wildlife.
 Boersma, Larry L 1960 Emeritus Professor Crop and Soil Science.
 Bond, Barbara J 1992 Emeritus Professor Forest Ecosyst & Society.
 Bonham, Earl E 1955 Emeritus Associate Professor Extension Service Prgram.
 Boots, Donald S 1977 Emeritus Professor Student Health Services.
 Borg, Marcus J 1979 Emeritus Professor Philosophy.
 Borgir, Tharald 1967 Emeritus Professor Music.
 Boucot, Arthur J 1969 Emeritus Professor Zoology.
 Bowker, Judith K 1991 Emeritus Associate Professor Speech Communication.
 Bowman, Marian Y 1964 Emeritus Professor Art.
 Boyle, James R 1981 Emeritus Professor Forest Eng/Resources/Mgmt.
 Braker, Marjorie J 1979 Emeritus Associate Professor EXT Fam/CommHlth OnCmps.
 Branch, Harrison 1972 Emeritus Professor Art.
 Brandt, Jeanette 1973 Emeritus Associate Professor College of Business.
 Brandt, Patricia E 1962 Emeritus Professor Information Services.
 Brandt, William H 1956 Emeritus Associate Professor Ag Botany/Plant Path.
 Brazee, Edward B 1964 Emeritus Associate Professor Information Services.
 Breen, Patrick J 1974 Emeritus Professor Horticulture.
 Brennan, William J 1966 Emeritus Associate Professor Dean of Students.
 Brewer, Donald H 1957 Emeritus Professor Crop and Soil Science.
 Brewster, Bill D 1975 Emeritus Senior Instructor I Crop and Soil Science.
 Britton, Gwyneth E 1965 Emeritus Professor College of Education.
 Broderick, William P 1986 Emeritus Associate Professor Ext Morrow County Office.
 Brodie, J Douglas 1975 Emeritus Professor Forest Eng/Resources/Mgmt.
 Brookhyser, Evelyn 1966 Emeritus Professor EXT Fam/CommHlth OnCmps.
 Brooks, Royal H 1967 Emeritus Professor Biol & Ecol Engineering.
 Brown, Carol E 1978 Emeritus Associate Professor College of Business.
 Brown, Clinton A 1970 Emeritus Professor Art.
 Brown, Daniel J 1974 Emeritus Associate Professor College of Business.
 Brown, Dorothy F 1964 Emeritus Professor Extension Service Prgram.
 Brown, Joy B 1962 Emeritus Professor Extension Service Prgram.
 Brown, Kenneth N 1963 Emeritus Professor Extension Service Prgram.
 Brown, Lyle R 1970 Emeritus Professor Microbiology (Science).
 Brown, Terence D 1975 Emeritus Professor Wood Science/Engr.
 Brown III, George W 1966 Dean Emeritus Professor College of Forestry Adm.

- Brown III, George W 1966 Emeritus Professor Forest Eng/Resources/Mgmt.
- Browne, William G 1970 Emeritus Professor College of Business.
- Brownell, Philip 1979 Emeritus Professor Zoology.
- Brumley, Richard L 1993 Emeritus Associate Professor Library.
- Brunner, Charles C 1984 Emeritus Associate Professor Wood Science/Engr.
- Bryan, M E 1972 Emeritus Associate Professor Univ Housing and Dining.
- Bryant, Nancy O 1974 Emeritus Professor College of Business.
- Buccola, Steven T 1980 Emeritus Professor Applied Economics.
- Buckhouse, John C 1975 Emeritus Professor Animal & Rnglnd Sciences.
- Bucy, David A 1956 Emeritus Professor Facilities Svcs Admin.
- Budd, Timothy A 1986 Emeritus Associate Professor Sch Elect Engr/Comp Sci.
- Buhler, Donald R 1967 Emeritus Professor Enviro/Molecular Toxic.
- Burgett, D M 1974 Emeritus Professor Horticulture.
- Burke, Mary E 1985 Emeritus Senior Instructor I Microbiology (Science).
- Burke, Michael J 1984 Emeritus Professor Horticulture.
- Burridge, Judith A 1968 Emeritus Professor Extension Service Prgam.
- Burriss, Nedry V 1968 Emeritus Assistant Professor Business Affairs.
- Burt, John G 1973 Emeritus Professor General Agriculture.
- Burt, Lawrence A 1979 Emeritus Associate Professor Applied Econ Extension.
- Butcher, Karyle S 1981 Emeritus Professor Library.
- Butler, David A 1975 Emeritus Professor Statistics (Science).
- Byrne, John V 1964 Emeritus Professor Earth, Ocean & Atmo Sci.
- Byrne, John V 1964 President Emeritus Office of the President.
- C**
- Cadart-Ricard, Odette 1965 Emeritus Professor Foreign Langs and Lits.
- Caldwell, Douglas R 1968 Emeritus Professor Earth, Ocean & Atmo Sci.
- Calvert, Janet K 1982 Emeritus Associate Professor Extension Service Prgam.
- Calvert, Leonard J 1961 Emeritus Associate Professor Ext/Exp S Communications.
- Cameron, H R 1955 Emeritus Professor Ag Botany/Plant Path.
- Campbell, Elizabeth A 1984 Emeritus Professor Sch of Wrtg Lit & Film.
- Campbell III, Allan 1976 Emeritus Associate Professor Forest Ecosyst & Society.
- Cannon, Lynn E 1963 Emeritus Professor Extension Service Prgam.
- Carey Jr, Andrew G 1961 Emeritus Professor Earth, Ocean & Atmo Sci.
- Carlson, Roy W 1958 Emeritus Associate Professor Sch of Wrtg Lit & Film.
- Carlson, Theodore H 1961 Emeritus Associate Professor Liberal Arts Admin.
- Carr, Jay B 1979 Emeritus Professor Animal & Rnglnd Sci Extn.
- Carroll, Carleton W 1974 Emeritus Professor Foreign Langs and Lits.
- Carter, David S 1961 Emeritus Professor Mathematics.
- Carter, W G 1980 Emeritus Associate Professor Extension Service Prgam.
- Cassady, John M 2005 Emeritus Professor Pharmacy.
- Castle, Emery N 1954 Emeritus Professor Applied Economics.
- Caughy, Carol C 1990 Emeritus Associate Professor College of Business.
- Chamberlain, David J 1980 Emeritus Professor Animal & Rnglnd Sciences.
- Chambers, Kenton L 1968 Emeritus Professor Ag Botany/Plant Path.
- Champeau, Donna A 1995 Emeritus Associate Professor Sch of Soc/Bhav Hlth Sci.
- Chau, May Y 1994 Emeritus Associate Professor Library.
- Cheeke, Peter R 1965 Emeritus Professor Animal & Rnglnd Sciences.
- Chelton, Dudley B 1983 Emeritus Professor Earth, Ocean & Atmo Sci.
- Chen, Paul M 1978 Emeritus Professor Horticulture.
- Chesley, Marie M 1986 Emeritus Associate Professor Speech Communication.
- Chilcote, David 1961 Emeritus Professor Crop and Soil Science.
- Ching, Te M 1956 Emeritus Professor Crop and Soil Science.
- Chona, Harbans S 1966 Emeritus Assistant Professor Library.
- Christensen, Neil W 1978 Emeritus Professor Crop and Soil Science.
- Church, D C 1956 Emeritus Professor Animal & Rnglnd Sciences.
- Clark, Glenn E 1968 Emeritus Professor College of Education.
- Claypool, Donald W 1964 Emeritus Assistant Professor Animal & Rnglnd Sciences.
- Clinton, Richard L 1976 Emeritus Professor Political Science.
- Clough, George H 1987 Emeritus Associate Professor Horticulture.
- Coakley Jr, James A 1988 Emeritus Professor Earth, Ocean & Atmo Sci.
- Coblentz, Bruce E 1975 Emeritus Professor Fisheries and Wildlife.
- Cohen, LeoNora M 1985 Emeritus Associate Professor College of Education.
- Cole, Richard L 1977 Emeritus Professor General Agriculture.
- Collier, Robert W 1981 Emeritus Professor Earth, Ocean & Atmo Sci.
- Collison, Brooke B 1989 Emeritus Professor College of Education.
- Conkey, Harlan D 1969 Emeritus Professor Speech Communication.
- Conklin, Frank S 1968 Emeritus Professor Applied Economics.
- Conner, Helen D 1963 Emeritus Professor Extension Service Prgam.
- Constantine Jr, G H 1966 Emeritus Professor Pharmacy.
- Conte, Frank P 1962 Emeritus Professor Zoology.
- Cook, Gordon H 1965 Emeritus Professor Crop and Soil Science.
- Cook, Thomas W 1977 Emeritus Associate Professor Horticulture.
- Coolen, Michael T 1978 Emeritus Professor Music.
- Coolican, Patricia M 1978 Emeritus Professor Extension Service Prgam.
- Copa, George H 1998 Emeritus Professor College of Education.
- Corden, Malcolm E 1958 Emeritus Professor Ag Botany/Plant Path.
- Cordray, Sheila M 1982 Emeritus Associate Professor Sociology.
- Cormack, Charles W 1963 Emeritus Professor Anthropology.
- Couch, Richard W 1963 Emeritus Associate Professor Earth, Ocean & Atmo Sci.
- Cowles, Timothy J 1984 Emeritus Professor Earth, Ocean & Atmo Sci.
- Crabtree, Garvin 1957 Emeritus Professor Horticulture.
- Craig, Richard P 1974 Emeritus Associate Professor Extension Service Admin.
- Craven, Gene F 1958 Emeritus Associate Professor College of Education.
- Crawford, David L 1958 Emeritus Professor COMES - Newport Exp Sta.
- Crisman, Russell O 1979 Emeritus Associate Professor Vet Clinical Sciences.
- Croft, Brian A 1982 Emeritus Professor Horticulture.
- Cromack Jr, Kermit 1974 Emeritus Professor Forest Ecosyst & Society.
- Cross, Frank R 1969 Emeritus Professor College of Education.
- Crowe, Frederick J 1984 Emeritus Associate Professor Ag Botany/Plant Path.
- Crozier Jr, William 1961 Emeritus Professor Art.
- Cruse, Donna F 1970 Emeritus Associate Professor Sch of Psychological Sci.
- Cull, Paul 1970 Emeritus Professor Sch Elect Engr/Comp Sci.
- Currier, Raymond A 1961 Emeritus Associate Professor Wood Science/Engr.
- Cusimano, Barbara E 1988 Emeritus Associate Professor Sch of Bio/Pop Hlth Sci.
- D**
- D'Ambrosio, Bruce D 1986 Emeritus Associate Professor Sch Elect Engr/Comp Sci.
- Dale, Robert D 1965 Emeritus Associate Professor Philosophy.
- Daley, Laurence S 1983 Emeritus Professor Horticulture.
- Dalrymple, G B 1994 Emeritus Professor Earth, Ocean & Atmo Sci.
- Dane, Charles W 1957 Emeritus Professor College of Business.
- Daniels, Malcolm 1965 Emeritus Professor Chemistry.
- Daniels, Richard J 1970 Emeritus Associate Professor Sch of Wrtg Lit & Film.

Danielson, Harold R 1968 Emeritus Senior Instructor I Crop and Soil Science.

Darnell, Thomas J 1978 Emeritus Professor Horticulture Extension.

Davis, John R 1971 Emeritus Professor Biol & Ecol Engineering.

Davis, Lorin R 1969 Emeritus Professor Sch of Mech/Ind/Mfg Engr.

Davis, Steven L 1983 Emeritus Professor Animal & Rnglnd Sciences.

Dawson, Peter S 1969 Emeritus Professor Zoology.

Day, Paul E 1972 Emeritus Associate Professor Extension Service Prgam.

De Angelis, Jack D 1988 Emeritus Associate Professor College of Ag Admin.

De Kock, Carroll W 1967 Emeritus Professor Chemistry.

De Szoek, Roland A 1977 Emeritus Professor Earth, Ocean & Atmo Sci.

DeYoung, Bruce R 1988 Emeritus Professor College of Business.

Dealy, Glen D 1967 Emeritus Professor Political Science.

Deardorff, James W 1978 Emeritus Professor Earth, Ocean & Atmo Sci.

Dedeurwaerder, Charles 1968 Emeritus Professor Liberal Arts Admin.

Deinzer, Max L 1973 Emeritus Professor Chemistry.

Dickinson, Ralph V 1968 Emeritus Associate Professor Sch of Bio/Pop Hlth Sci.

Dillon, Thomas M 1976 Emeritus Professor Earth, Ocean & Atmo Sci.

Dilson, Wolfgang O 1970 Emeritus Associate Professor Foreign Langs and Lits.

Dix, Russell G 1964 Emeritus Associate Professor Office of the Registrar.

Doler, Thurston E 1949 Emeritus Professor Speech Communication.

Donatelle, Rebecca J 1984 Emeritus Associate Professor Sch of Soc/Bhav Hlth Sci.

Dost, Frank N 1962 Emeritus Professor Enviro/ Molecular Toxic.

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Douglass, James M 1968 Emeritus Professor Music.

Drexler Jr, John A 1983 Emeritus Associate Professor College of Business.

Duddles, Ralph E 1988 Emeritus Associate Professor Forestry Extension.

Duncan, James A 1976 Emeritus Professor Ag Communications.

Duncan, Robert A 1977 Emeritus Professor Earth, Ocean & Atmo Sci.

Dunn, James W 1963 Emeritus Professor Office of Development.

Dunn, John M 1975 Emeritus Professor Sch of Bio/Pop Hlth Sci.

Dunnington, Leslie G 1969 Emeritus Associate Professor Counseling Center.

Dutson, Thayne R 1987 Emeritus Professor Food Science and Techno.

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Eiseman, David 1968 Emeritus Professor Music.

Elwood, Norman E 1979 Emeritus Associate Professor Forest Eng/Resourcs/Mgmt.

Emmingham, William H 1980 Emeritus Professor Forest Ecosyst & Society.

Engel, Evelyn A 1975 Emeritus Professor Ext/ Exp S Communications.

Engel Jr, Harold N 1979 Emeritus Professor Veterinary Medicine.

English, Marshall J 1978 Emeritus Professor Biol & Ecol Engineering.

Enochs, Larry G 1999 Emeritus Professor College of Education.

Erickson, Dianne K 1987 Emeritus Associate Professor College of Education.

Erickson, Linda P 1979 Emeritus Professor Ext Clackamas Co Office.

Esbensen, Steven K 1977 Emeritus Professor Earth, Ocean & Atmo Sci.

Evans, Glenn T 1977 Emeritus Professor Chemistry.

Evans, Gwil 1966 Emeritus Professor Ag Communications.

Evans, Thomas P 1968 Emeritus Professor College of Education.

F

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Farber, Paul L 1970 Emeritus Professor History.

Farber, Vreneli R 1979 Emeritus Professor Foreign Langs and Lits.

Farkas, Daniel F 1990 Emeritus Professor Food Science and Techno.

Farness, Donald H 1964 Emeritus Associate Professor Economics.

Faudskar, John D 1972 Emeritus Assistant Professor Fisheries and Wildlife.

Faulkenberry, G D 1991 Emeritus Professor Statistics (Science).

Fein, Burton I 1970 Emeritus Professor Mathematics.

Fendall, Roger K 1968 Emeritus Professor Crop and Soil Science.

Ferrell, William K 1965 Emeritus Professor Forest Ecosyst & Society.

Fielder, William R 1971 Emeritus Professor College of Education.

Fink, Gregory B 1964 Emeritus Professor Pharmacy.

Firth, James L 1973 Emeritus Associate Professor College of Education.

Fischer, C M 1947 Emeritus Professor Animal & Rnglnd Sci Extn.

Fisher, Glenn C 1976 Emeritus Professor Crop and Soil Science.

Flaherty, Francis J 1967 Emeritus Professor Mathematics.

Fletcher, Richard A 1979 Emeritus Professor Forest Eng/Resourcs/Mgmt.

Fletcher, Roger L 1967 Emeritus Professor Extension Service Admin.

Fontana, Peter R 1967 Emeritus Professor Physics.

Forbes, Orcilia Z 1998 Vice President Emeritus VP Univ Relations & Mktg.

Frakes, Rodney V 1960 Emeritus Professor VP for Research.

France, Thomas T 1969 Emeritus Assistant Professor Library.

Francis, Sally K 1982 Dean Emeritus Fellow Graduate School Admin.

Francis, Sally K 1982 Emeritus Professor Sch of Soc/Bhav Hlth Sci.

Frank, Robert J 1970 Emeritus Professor Liberal Arts Admin.

Fraundorf, Martha N 1975 Emeritus Associate Professor Economics.

Freeman, Peter K 1968 Emeritus Professor Chemistry.

Frenkel, Robert E 1965 Emeritus Professor Earth, Ocean & Atmo Sci.

Friedemann, Dale H 1966 Emeritus Professor Extension Service Prgam.

Frischknecht, W D 1956 Emeritus Professor Extension Service Prgam.

Frishkoff, Patricia A 1978 Emeritus Professor College of Business.

Fritzell, Erik K 1994 Emeritus Professor Fisheries and Wildlife.

Fuchigami, Leslie H 1970 Emeritus Professor Horticulture.

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Gamroth, Michael J 1974 Emeritus Professor Animal & Rnglnd Sci Extn.

Gardner Jr, John A 1973 Emeritus Professor Physics.

Garity, Dennis J 1981 Emeritus Professor Mathematics.

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Gates, Dillard H 1980 Emeritus Professor Animal & Rnglnd Sciences.

Gates, W L 1998 Emeritus Professor Earth, Ocean & Atmo Sci.

Gentle, Thomas H 1976 Emeritus Professor Ext/Exp S Communications.

George, Melvin R 1984 Emeritus Professor Information Services.

George, Richard A 1969 Emeritus Associate Professor Speech Communication.

Georgiou, Constance 1987 Emeritus Associate Professor Sch of Bio/Pop Hlth Sci.

Gibbs, Wallace E 1958 Emeritus Professor Office of the Registrar.

Gillis, John S 1976 Emeritus Professor Sch of Psychological Sci.

Gingrich, Gale A 1973 Emeritus Professor Crop and Soil Science.

Glass, William R 1956 Emeritus Professor College of Business.

Gleicher, Gerald J 1966 Emeritus Professor Chemistry.

Gobeli, David H 1982 Emeritus Professor College of Business.

Goering, Lois A 1988 Emeritus Assistant Professor EXT Fam/CommHlth OnCmps.

Goetze, Norman 1959 Emeritus Professor College of Ag Admin.

Gonor, Jefferson J 1964 Emeritus Professor Earth, Ocean & Atmo Sci.

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Good, James W 1980 Emeritus Professor Earth, Ocean & Atmo Sci.

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Grabe, Don F 1968 Emeritus Professor Crop and Soil Science.

Gravatt, Margaret 1973 Emeritus Professor Student Health Services.

Gray, Clifford F 1961 Emeritus Professor College of Business-Adm.

Greer, Arthur 1981 Emeritus Associate Professor Applied Economics.

Gregerson, Donna M 1974 Emeritus Professor EXT Fam/CommHlth OnCmps.

Gregory, Stanley V 1981 Emeritus Professor Fisheries and Wildlife.

Griggs, Lawrence F 1972 Emeritus Associate Professor Educ Opportunities Prgm.

Grigsby, Tom E 1973 Emeritus Associate Professor College of Education.

Grosskopf, Shawna P 1998 Emeritus Professor Economics.

Guenther, Ronald B 1967 Emeritus Professor Mathematics.

Gutbrod, Oscar A 1966 Emeritus Assistant Professor Crop and Soil Science.

H

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Hagelstein, Fred 1967 Emeritus Professor Extension Service Prgram.

Hagen, Ivan J 1969 Emeritus Senior Instructor - LEGACY Crop/Soil Sci Extension.

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Hall, Roberta L 1975 Emeritus Professor Anthropology.

Hamilton, Margaret E 1957 Emeritus Professor Extension Service Prgram.

Hamilton, Robert R 1968 Emeritus Professor Extension Service Prgram.

Hamm, Philip B 1975 Emeritus Professor Ag Botany/Plant Path.

Hancock, Astrid F 1963 Emeritus Assistant Professor Sch of Bio/Pop Hlth Sci.

Hanna, Susan S 1977 Emeritus Professor Applied Economics.

Hansen, Everett M 1972 Emeritus Professor Ag Botany/Plant Path.

Hansen, Herbert E 1974 Emeritus Associate Professor College of Ag Admin.

Hansen, N J 1998 Emeritus Professor College of Ag Extension.

Hardesty, David P 1970 Emeritus Professor Art.

Harger, Virginia F 1967 Emeritus Professor Sch of Bio/Pop Hlth Sci.

Harper, James A 1942 Emeritus Professor Animal & Rnglnd Sciences.

Harris, Irwin C 1947 Emeritus Professor Memorial Union.

Harrison, William L 1974 Emeritus Professor College of Business-Adm.

Hart, Dianne W 1981 Emeritus Senior Instructor I Foreign Langs and Lits.

Hart, John M 1984 Emeritus Professor Crop and Soil Science.

Hart, Ralph D 1969 Emeritus Professor Crop/Soil Sci Extension.

Harward, Moyle E 1964 Emeritus Professor Crop and Soil Science.

Hashimoto, Andrew G 1986 Emeritus Professor Biol & Ecol Engineering.

Hathaway, Ronald L 1972 Emeritus Animal & Rnglnd Sci Extn.

Haun, James F 1964 Emeritus Professor Office of the Registrar.

Haverson, Wayne W 1978 Emeritus Professor College of Education.

Hawkes, Stephen J 1968 Emeritus Professor Chemistry.

Hay, James W 1977 Emeritus Senior Instructor I Horticulture.

Hayes, Wilson C 1998 Emeritus Professor Sch of Bio/Pop Hlth Sci.

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Hedberg, Kenneth W 1955 Emeritus Professor Chemistry.

Heikkila, Paul A 1969 Emeritus Associate Professor Fisheries and Wildlife.

Hellickson, Martin L 1975 Emeritus Associate Professor Biol & Ecol Engineering.

Helmick, Sandra A 1991 Emeritus Professor Sch of Soc/Bhav Hlth Sci.

Hemphill, Delbert D 1976 Emeritus Professor Horticulture.

Hendricks, Jerry D 1975 Emeritus Professor Enviro/Molecular Toxic.

Hendricks, Jon A 1988 Emeritus Professor Univ Honors College.

Hendricks, Jon A 1988 Emeritus Professor Sociology.

Hermann, Richard K 1961 Emeritus Professor Forest Eng/Resources/Mgmt.

Herzog, James H 1967 Emeritus Associate Professor Sch Elect Engr/Comp Sci.

Hetherington, William M 1987 Emeritus Associate Professor Physics.

Hibbs, David E 1983 Emeritus Professor Forest Ecosyst & Society.

Hicks, Russell G 1975 Emeritus Professor College of Engineering.

Higgins, Karen 1986 Emeritus Associate Professor College of Education.

Hildebrandt, Emery V 1954 Emeritus Professor Speech Communication.

Hilderbrand, Kenneth S 1969 Emeritus Associate Professor Food Science and Techno.

Hisaw, Frederick L 1958 Emeritus Associate Professor Zoology.

Hixon, Mark A 1984 Emeritus Professor Zoology.

Hobbs, Beverly B 1989 Emeritus Professor EXT 4-H YouthDev OnCmps.

Hobbs, Stephen D 1978 Emeritus Professor Forest Eng/Resources/Mgmt.

Holman, Robert A 1979 Emeritus Professor Earth, Ocean & Atmo Sci.

Holmes, Zoe A 1974 Emeritus Professor Sch of Bio/Pop Hlth Sci.

Holtan, Donald W 1975 Emeritus Associate Professor Animal & Rnglnd Sciences.

Holyoak, Arlene 1981 Emeritus Associate Professor Sch of Soc/Bhav Hlth Sci.

Horne, Frederick H 1986 Emeritus Professor Chemistry.

Horowitz, Irwin A 1994 Emeritus Professor Sch of Psychological Sci.

Horton, Howard F 1958 Emeritus Professor Fisheries and Wildlife.

Hosoi, Yasuharu T 1969 Emeritus Associate Professor Philosophy.

Hovland, Clarence W 1949 Emeritus Professor Liberal Arts Admin.

Howell, Michael E 1973 Emeritus Professor Animal & Rnglnd Sciences.

Huber, Wayne C 1991 Emeritus Professor Sch of Civil/Constr Engr.

Huddleston, J H 1975 Emeritus Professor Crop and Soil Science.

Hudspeth, Robert T 1974 Emeritus Professor Sch of Civil/Constr Engr.

Hutton, Norman E 1977 Emeritus Professor Veterinary Medicine.

Huyer, Adriana 1972 Emeritus Professor Earth, Ocean & Atmo Sci.

I

Ingle Jr, James D 1971 Emeritus Professor Chemistry.

Ingram, Patricia C 1970 Emeritus Assistant Professor Sch of Bio/Pop Hlth Sci.

Irvin, Richard F 1967 Emeritus Associate Professor Sch of Bio/Pop Hlth Sci.

Isley, Arleigh G 1969 Emeritus Associate Professor Extension Service Prgram.

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Jackson, Philip L 1978 Emeritus Professor Earth, Ocean & Atmo Sci.

Jackson, Royal G 1970 Emeritus Associate Professor Forest Ecosyst & Society.

Jacobson, Robert W 1967 Emeritus Professor Extension Service Prgram.

Jarvis, Robert L 1971 Emeritus Professor Fisheries and Wildlife.

Jeffers, Ronald H 1974 Emeritus Associate Professor Music.

Jeffrey Jr, Hugh F 1950 Emeritus Professor Business Affairs.

Jensen, Harold J 1950 Emeritus Professor Ag Botany/Plant Path.

Johnson, Arthur G 1966 Emeritus Professor Radiation Center.

Johnson, Arthur G 1966 Emeritus Professor Nuclear Engineering.

Johnson, Douglas E 1982 Emeritus Professor Animal & Rnglnd Sciences.

Johnson, Duane P 1959 Emeritus Professor College of Education.

Johnson, Sharon D 2000 Emeritus Associate Professor Sch of Soc/Bhav Hlth Sci.
 Johnson, Simon S 1971 Emeritus Associate Professor Sch of Wrtg Lit & Film.
 Johnson Jr, W C 1968 Emeritus Professor Biochem/Biophysics.
 Johnston, Alberta B 1963 Emeritus Professor Extension Service Admin.
 Johnston, LaRea D 1960 Emeritus Senior Instructor I Ag Botany/Plant Path.
 Johnston, Richard S 1966 Emeritus Professor Applied Economics.
 Jolliff, Gary D 1976 Emeritus Professor Crop and Soil Science.
 Jones, Robert W 1962 Emeritus Assistant Professor Sch of Wrtg Lit & Film.
 Jordan, Cheryl L 1976 Emeritus Assistant Professor College of Business.

K

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 Keller, George H 1975 Emeritus VP for Research.
 Keller, George H 1975 Emeritus Professor Earth, Ocean & Atmo Sci.
 Kelsey, Mary W 1958 Emeritus Associate Professor Sch of Bio/Pop Hlth Sci.
 Kemp, Patrick S 1974 Emeritus Professor College of Business.
 Kennedy, Timothy C 1976 Emeritus Professor Sch of Mech/Ind/Mfg Engr.
 Kenneke, Larry J 1970 Emeritus Professor College of Education.
 Kerkvliet, Nancy I 1977 Emeritus Professor Enviro/Molecular Toxic.
 Ketchum, Lynn G 1988 Emeritus Professor Ext/Exp S Communications.
 Kiekel, Robert D 1966 Emeritus Associate Professor Foreign Langs and Lits.
 Kiigemagi, Ulo 1954 Emeritus Senior Instructor I Enviro/Molecular Toxic.
 Kimerling, A J 1976 Emeritus Professor Earth, Ocean & Atmo Sci.
 Kimura, Shoichi 1989 Emeritus Professor Sch of Chem/Bio/Envr Eng.
 Kinch, Michael P 1969 Emeritus Professor Information Services.
 King, Charles E 1977 Emeritus Professor Zoology.
 King, David B 1963 Emeritus Professor History.
 King, Jonathan B 1980 Emeritus Associate Professor College of Business.
 King, Keith I 1969 Emeritus Senior Instructor I Biology.
 King, Lynda J 1986 Emeritus Professor Foreign Langs and Lits.
 Kingsley, Kenneth 1974 Emeritus Professor Ext/Exp S Communications.
 Kirk, Dale E 1954 Emeritus Professor Biol & Ecol Engineering.
 Klemke, Lloyd W 1970 Emeritus Professor Sociology.
 Kling, Gerald F 1974 Emeritus Associate Professor Crop and Soil Science.
 Klingeman, Peter C 1966 Emeritus Professor Sch of Civil/Constr Engr.

Klinkhammer, Gary P 1990 Emeritus Professor Earth, Ocean & Atmo Sci.
 Knothe, Carol A 1972 Emeritus Associate Professor Ext Malheur Co Office.
 Knutson, Devon D 1994 Emeritus Associate Professor Animal & Rnglnd Sciences.
 Kocher, Carl A 1973 Emeritus Professor Physics.
 Koepsell, Paul A 1969 Emeritus Professor Ag Botany/Plant Path.
 Koester, Ardis W 1974 Emeritus Professor EXT Fam/CommHlth OnCmps.
 Kogan, Marcos 1991 Emeritus Professor Horticulture.
 Kolbe, Edward R 1974 Emeritus Professor Biol & Ecol Engineering.
 Kolding, Mathias F 1968 Emeritus Senior Instructor I Hermiston Exp Sta.
 Komar, Paul D 1970 Emeritus Professor Earth, Ocean & Atmo Sci.
 Koong, Ling-Jung 1987 Emeritus Professor Animal & Rnglnd Sciences.
 Kozlik, Charles J 1961 Emeritus Associate Professor Wood Science/Engr.
 Kradjan, Wayne A 1998 Emeritus Professor Pharmacy.
 Kradjan, Wayne A 1998 Dean Emeritus Professor College of Pharmacy-Adm.
 Krahmmer, Robert L 1961 Emeritus Professor Wood Science/Engr.
 Krane, Kenneth S 1974 Emeritus Professor Physics.
 Krantz, Gerald W 1955 Emeritus Professor College of Science Admin.
 Krueger, James H 1961 Emeritus Professor Chemistry.
 Krueger, Judith C 1966 Emeritus Senior Instructor I Music.
 Krueger, William C 1971 Emeritus Professor Animal & Rnglnd Sciences.
 Kulm, Laverne D 1964 Emeritus Professor Earth, Ocean & Atmo Sci.

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 Langford, Charles C 1970 Emeritus Associate Professor Sociology.
 Larsen, Knud S 1969 Emeritus Professor Sch of Psychological Sci.
 Larson, Milton B 1969 Emeritus Professor Sch of Mech/Ind/Mfg Engr.
 Larson, Robert E 1965 Emeritus Professor Pharmacy.
 Larwood, Lillian L 1988 Emeritus Professor EXT 4-H YouthDev OnCmps.
 Lattin, John D 1955 Emeritus Professor College of Science Admin.
 Laursen, Harold I 1963 Emeritus Professor Sch of Civil/Constr Engr.
 Lavender, Denis P 1961 Emeritus Professor Forest Ecosyst & Society.
 Laver, Murray L 1969 Emeritus Associate Professor Wood Science/Engr.
 Law, Duncan K 1944 Emeritus Professor COMES - Newport Exp Sta.

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 Lawson, David C 1969 Emeritus Associate Professor Sch of Bio/Pop Hlth Sci.
 Lawton, Stephen J 1976 Emeritus Associate Professor College of Business.
 Layton, Robert D 1972 Emeritus Professor Sch of Civil/Constr Engr.
 Le Sueur, Billie 1965 Emeritus Professor Extension Service Prgam.
 Lee, John W 1969 Emeritus Professor Mathematics.
 Leeson, Theodore A 1984 Emeritus Senior Instructor I Sch of Wrtg Lit & Film.
 Leffel, John A 1962 Emeritus Professor Extension Service Prgam.
 Leklem, James E 1975 Emeritus Professor Sch of Bio/Pop Hlth Sci.
 Leman, Nancy F 1971 Emeritus Instructor Sch of Wrtg Lit & Film.
 Leno, Janice R 1988 Emeritus Associate Professor EXT Fam/CommHlth OnCmps.
 Leong, Joann C 1975 Emeritus Professor Microbiology (Science).
 Levenspiel, Octave 1969 Emeritus Professor Sch of Chem/Bio/Envr Eng.
 Levi, Shaul 1977 Emeritus Professor Earth, Ocean & Atmo Sci.
 Levine, Shepard 1954 Emeritus Professor Art.
 Lewis, Margaret J 1971 Emeritus Assistant Professor EXT Fam/CommHlth OnCmps.
 Libbey, Leonard M 1961 Emeritus Professor Food Science and Techno.
 Lillie, Robert J 1984 Emeritus Professor Earth, Ocean & Atmo Sci.
 Liss, William J 1977 Emeritus Professor Fisheries and Wildlife.
 List, Peter C 1967 Emeritus Professor Philosophy.
 Locke, Kerry A 1985 Emeritus Professor Crop and Soil Science.
 Loeb, Barbara E 1985 Emeritus Associate Professor Art.
 Lombard, Porter B 1963 Emeritus Professor Horticulture.
 Lomonte, Rosemarie 1959 Emeritus Associate Professor Information Services.
 Lovell, Ronald P 1972 Emeritus Professor Sch of Wrtg Lit & Film.
 Lowrie, Miriam J 1971 Emeritus Professor Ext Polk County Office.
 Ludwig, Martin J 1952 Emeritus Assistant Professor Sch of Wrtg Lit & Film.
 Lunch, William M 1984 Emeritus Professor Political Science.
 Lund, Steve 1975 Emeritus Professor Columbia Basin Exp Sta.
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 Lyford, John H 1966 Emeritus Associate Professor College of Science Admin.

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- Maksud, Michael G 1980 Dean Emeritus Professor Sch of Bio/Pop Hlth Sci.
- Males, James R 1998 Emeritus Professor Animal & Rnglnd Sciences.
- Malouf, Robert E 1991 Emeritus Professor Fisheries and Wildlife.
- Malueg, Sara E 1966 Emeritus Liberal Arts Admin.
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- Mansour, N S (Bill) 1970 Emeritus Professor Horticulture Extension.
- Maresh, Thomas J 1967 Dean Emeritus Graduate School Admin.
- Maresh, Thomas J 1967 Emeritus Professor Earth, Ocean & Atmo Sci.
- Markle, Douglas F 1985 Emeritus Professor Fisheries and Wildlife.
- Martin, Lloyd W 1967 Emeritus Professor North Willamette Exp Sta.
- Marvell, Elliot N 1948 Emeritus Professor Chemistry.
- Massie, John W 1956 Emeritus Professor Extension Service Prgram.
- Mast, M JoAnn 1990 Emeritus Professor College of Education.
- Mathany, Allan R 1975 Emeritus Associate Professor Budget/Fiscal Planning.
- Mathews, Christopher K 1978 Emeritus Professor Biochem/Biophysics.
- Matsumoto, Masakazu 1975 Emeritus Professor Veterinary Medicine.
- Matzke, Gordon E 1977 Emeritus Professor Earth, Ocean & Atmo Sci.
- Maughan, Laurel S 1972 Emeritus Associate Professor Library.
- Mc Caughan, William T 2000 Emeritus Extended Campus.
- Mc Clellan, Thomas J 1945 Emeritus Professor Sch of Civil/Constr Engr.
- Mc Clintock, Thomas C 1959 Emeritus Liberal Arts Admin.
- Mc Clintock, Thomas C 1959 Emeritus Professor History.
- Mc Creight, Keith R 1971 Emeritus Assistant Professor Financial Aid/Scholarshp.
- Mc Cubbin, Jeffrey A 1988 Emeritus Professor Sch of Bio/Pop Hlth Sci.
- Mc Daniel, Mina R 1983 Emeritus Professor Food Science and Techno.
- Mc Farland, Floyd B 1963 Emeritus Associate Professor Economics.
- Mc Farlane, Dale D 1965 Emeritus Professor College of Business.
- Mc Grath, Edward G 1965 Emeritus Professor Political Science.
- Mc Innis, Mike L 1985 Emeritus Professor Animal & Rnglnd Sciences.
- Mc Intire, Charles D 1961 Emeritus Professor Ag Botany/Plant Path.
- Mc Lain, Thomas E 1993 Emeritus Professor Wood Science/Engr.
- Mc Mahan, Linda R 2000 Emeritus Associate Professor Horticulture.
- Mc Mullen, B Starr 1980 Emeritus Professor Economics.
- Mc Neilan, Ray A 1964 Emeritus Professor Horticulture Extension.
- Mc Reynolds, Robert B 1982 Emeritus Associate Professor Horticulture Extension.
- McGrath, Daniel M 1983 Emeritus Professor Horticulture.
- Mead, Clifford S 1986 Emeritus Professor Library.
- Meehan, Margaret E 1970 Emeritus Senior Instructor I History.
- Megale, Donald M 1958 Emeritus Associate Professor Sch of Bio/Pop Hlth Sci.
- Meints, Russel H 1988 Emeritus Professor Ag Botany/Plant Path.
- Mellbye, Mark E 1986 Emeritus Professor Crop and Soil Science.
- Messersmith, Ann M 1978 Emeritus Professor Public Hlth/HumanSci Adm.
- Meyer, Howard H 1983 Emeritus Professor Animal & Rnglnd Sciences.
- Michael, Carol L 1989 Emeritus Associate Professor EXT Fam/CommHlth OnCmps.
- Michael, Robert E 1968 Emeritus Associate Professor Sch of Bio/Pop Hlth Sci.
- Mielke, Eugene A 1984 Emeritus Professor Horticulture.
- Miles, Stanley D 1966 Emeritus Associate Professor Applied Economics.
- Miller, Charles B 1970 Emeritus Professor Earth, Ocean & Atmo Sci.
- Miller, Donald J 1961 Emeritus Associate Professor Wood Science/Engr.
- Miller, Richard F 1977 Emeritus Professor Animal & Rnglnd Sciences.
- Miller, Ronald L 1987 Emeritus Professor College of Business.
- Miller, Terry L 1970 Emeritus Professor Enviro/Molecular Toxic.
- Mills, Dallice I 1976 Emeritus Professor Ag Botany/Plant Path.
- Mills, Randall R 1984 Emeritus Associate Professor Animal & Rnglnd Sci Extn.
- Mingle Jr, John G 1960 Emeritus Professor Sch of Mech/Ind/Mfg Engr.
- Minnick, Miriam S 1957 Emeritus Professor Information Services.
- Minoura, Toshimi 1982 Emeritus Associate Professor Sch Elect Engr/Comp Sci.
- Mitchell, Gregg F 1979 Emeritus Associate Professor Extension Service Prgram.
- Mitchell, Velma R 1966 Emeritus Professor Extension Service Prgram.
- Mitchell Jr, Richard G 1979 Emeritus Professor Sociology.
- Mix, Michael C 1970 Emeritus Professor Zoology.
- Mobley, Ronald T 1968 Emeritus Professor Horticulture.
- Mohler, Ronald 1972 Emeritus Assistant Professor Sch Elect Engr/Comp Sci.
- Mok, David W 1975 Emeritus Professor Horticulture.
- Mok, Machteld C 1975 Emeritus Professor Horticulture.
- Moore, Frank L 1975 Emeritus Professor Zoology.
- Moore, James A 1979 Emeritus Professor Biol & Ecol Engineering.
- Moore, Sylvia L 1966 Emeritus Associate Professor Sch of Bio/Pop Hlth Sci.
- Morita, Richard Y 1962 Emeritus Professor Microbiology (Science).
- Morris, John E 1968 Emeritus Professor Zoology.
- Morris Jr, Robert J 1965 Emeritus Associate Professor Earth, Ocean & Atmo Sci.
- Morrison, Betty J 1973 Emeritus Associate Professor Extension Service Prgram.
- Morrow, Alice M 1980 Emeritus Professor EXT Fam/CommHlth OnCmps.
- Mosher, Wayne D 1966 Emeritus Professor Extension Service Admin.
- Mosley, Alvin R 1977 Emeritus Associate Professor Crop and Soil Science.
- Moule, Jean G 1997 Emeritus Associate Professor College of Education.
- Muckleston, Keith W 1965 Emeritus Professor Earth, Ocean & Atmo Sci.
- Mukatis, W Alfred 1980 Emeritus Associate Professor College of Business.
- Mumaw, Catherine R 1987 Emeritus Associate Professor Sch of Soc/Bhav Hlth Sci.
- Murphy, Glen E 2001 Emeritus Professor Forest Eng/Resources/Mgmt.
- Murphy, Lea F 1980 Emeritus Associate Professor Mathematics.
- Murphy, Thomas A 1965 Emeritus Associate Professor Sch of Psychological Sci.
- Musser, Gary L 1972 Emeritus Professor Mathematics.

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- Nakaue, Harry S 1971 Emeritus Professor Animal & Rnglnd Sciences.
- Nath, John H 1970 Emeritus Professor Sch of Civil/Constr Engr.
- Nelson, David M 1977 Emeritus Professor Earth, Ocean & Atmo Sci.
- Nelson, Peter O 1975 Emeritus Associate Professor Sch of Civil/Constr Engr.
- Neshyba, Stephen J 1965 Emeritus Professor Earth, Ocean & Atmo Sci.
- Neumann, Catherine M 1994 Emeritus Associate Professor Sch of Bio/Pop Hlth Sci.
- Newberger, Stuart M 1969 Emeritus Associate Professor Mathematics.
- Newburgh, R W 1959 Emeritus Professor Biochem/Biophysics.
- Newton, Michael 1960 Emeritus Professor Forest Eng/Resources/Mgmt.
- Neyhart Jr, Charles A 1972 Emeritus Professor College of Business.
- Nibler, Joseph W 1967 Emeritus Professor Chemistry.
- Nice, Karl J 1969 Emeritus Assistant Professor College of Education.
- Nielsen, James F 1974 Emeritus Professor College of Business.
- Niem, Alan R 1970 Emeritus Professor Earth, Ocean & Atmo Sci.

Niess, Margaret L 1978 Emeritus Professor College of Education.
 Nolan, Mary L 1973 Emeritus Professor Earth, Ocean & Atmo Sci.
 Norris, Logan A 1962 Emeritus Professor Forest Ecosyst & Society.
 Northcraft, Martin E 1955 Emeritus Associate Professor Sch of Civil/Constr Engr.
 Nye, Mary J 1994 Emeritus Professor History.
 Nye, Robert A 1994 Emeritus Professor History.

O

Oester, Louis M 1955 Emeritus Professor Extension Service Prgram.
 Ohvall, Richard A 1976 Emeritus Professor College of Pharmacy-Adm.
 Oldfield, James E 1951 Emeritus Professor Animal & Rnglnd Sciences.
 Oles, Keith F 1961 Emeritus Professor Earth, Ocean & Atmo Sci.
 Olsen, Eldon D 1979 Emeritus Associate Professor Forest Eng/Resources/Mgmt.
 Olson, Geraldine I 1975 Emeritus Professor Sch of Soc/Bhav Hlth Sci.
 Olson, Robert E 1968 Emeritus Professor Fisheries and Wildlife.
 Oriard, Michael V 1976 Emeritus Professor Sch of Wrtg Lit & Film.
 Orzech, Miriam W 1968 Emeritus Professor The SMILE Program.
 Osborne, Judith L 1991 Emeritus Associate Professor College of Education.
 Osborne, Owen D 1990 Emeritus Professor Extension Service Admin.
 Osis, Vicki J 1968 Emeritus Professor Fisheries and Wildlife.

P

Pahl, Janet M 1976 Emeritus Assistant Professor EXT Fam/CommHlth OnCmps.
 Parker, Donald F 1991 Emeritus Professor College of Business.
 Parks, Harold R 1977 Emeritus Professor Mathematics.
 Parnell, Dale 1992 Emeritus Professor College of Education.
 Passon, David E 1960 Emeritus Professor Crop/ Soil Sci Extension.
 Patterson, Kenneth D 1959 Emeritus Professor Economics.
 Patton, Nephi M 1972 Emeritus Professor Lab Animal Resources.
 Paulsen, Lenore M 1969 Emeritus Assistant Professor Extension Service Prgram.
 Paulson, Clayton A 1971 Emeritus Professor Earth, Ocean & Atmo Sci.
 Percy, William G 1960 Emeritus Professor Earth, Ocean & Atmo Sci.
 Pearson, Erwin G 1982 Emeritus Professor Veterinary Medicine.
 Pearson, George D 1971 Emeritus Professor Biochem/Biophysics.
 Pease, James R 1972 Emeritus Professor Earth, Ocean & Atmo Sci.
 Peckham, Charles W 1965 Emeritus Assistant Professor Printing and Mailing Svc.
 Penhallegon, Ross H 1983 Emeritus Associate Professor Horticulture.

Penn, John R 1972 Emeritus Professor Vice Prov/Student Aff.
 Perry, David A 1977 Emeritus Professor Forest Ecosyst & Society.
 Perry, Gregory M 1986 Emeritus Professor Applied Economics.
 Peters, Jean H 1958 Emeritus Associate Professor Public Hlth/HumanSci Adm.
 Peters, Kurt M 1996 Emeritus Professor Ethnic Studies.
 Petersen, Bent E 1969 Emeritus Professor Mathematics.
 Petrie, Steven E 2000 Emeritus Professor Crop and Soil Science.
 Petzel, Florence E 1960 Emeritus Professor College of Business.
 Phelps, David W 1965 Emeritus Professor Sch of Soc/Bhav Hlth Sci.
 Phelps, Robert E 1968 Emeritus Associate Professor Sch of Civil/Constr Engr.
 Philbrick, David A 1983 Emeritus Associate Professor Public Hlth/HumanSci Adm.
 Philipp, Kurt D 1964 Emeritus Associate Professor History.
 Phillips, Robert L 1957 Emeritus Professor Liberal Arts Admin.
 Phipps, Wanda L 1968 Emeritus Associate Professor Extension Service Prgram.
 Pierce, Donald A 1966 Emeritus Professor Statistics (Science).
 Pisas, Nicklas G 1981 Emeritus Professor Earth, Ocean & Atmo Sci.
 Plant, Thomas K 1978 Emeritus Associate Professor Sch Elect Engr/Comp Sci.
 Plants, Constance P 1960 Emeritus Senior Instructor I Public Hlth/HumanSci Adm.
 Poling, Dow P 1963 Emeritus Associate Professor Sch of Bio/Pop Hlth Sci.
 Poole, Arthur P 1975 Emeritus Professor Horticulture Extension.
 Powelson, Mary L 1968 Emeritus Professor Ag Botany/Plant Path.
 Powelson, Robert L 1957 Emeritus Professor Ag Botany/Plant Path.
 Pratt, Clara C 1978 Emeritus Professor Sch of Soc/Bhav Hlth Sci.
 Pritchett, Harold D 1957 Emeritus Professor Sch of Civil/Constr Engr.
 Proebsting, William M 1980 Emeritus Professor Horticulture.
 Pumphrey, Floyd V 1957 Emeritus Professor Columbia Basin Exp Sta.
 Pyles, Marvin R 1981 Emeritus Professor Forest Eng/Resources/Mgmt.

R

Rackham, Robert L 1971 Emeritus Professor Extension Service Prgram.
 Radosevich, Steven R 1983 Emeritus Professor Forest Ecosyst & Society.
 Ramsey, Fred L 1966 Emeritus Professor Statistics (Science).
 Rathja, Roy C 1972 Emeritus Associate Professor Sch Elect Engr/Comp Sci.
 Rauen, Paul M 1959 Emeritus Professor Extension Service Prgram.
 Reed, Donald J 1962 Emeritus Professor Biochem/Biophysics.

Reed, Gary L 1985 Emeritus Professor College of Ag Admin.
 Reed, Marjorie A 1987 Emeritus Associate Professor Sch of Psychological Sci.
 Reistad, Gordon M 1970 Emeritus Professor Sch of Mech/Ind/Mfg Engr.
 Reno, Paul W 1990 Emeritus Professor Microbiology (Ag).
 Rettig, Jack L 1961 Emeritus Professor College of Business.
 Rettig, Raymond B 1968 Emeritus Professor Applied Economics.
 Rice, Laura P 1980 Emeritus Professor Sch of Wrtg Lit & Film.
 Richardson, Daryl 1973 Emeritus Professor Horticulture.
 Rickson, Fred R 1971 Emeritus Professor Ag Botany/Plant Path.
 Riedl, Helmut W 1985 Emeritus Professor Enviro/Molecular Toxic.
 Rielly, Loretta J 1990 Emeritus Professor Library.
 Righetti, Timothy L 1983 Emeritus Professor Horticulture.
 Ringle, John C 1966 Emeritus Professor Graduate School Admin.
 Ringle, John C 1966 Emeritus Professor Nuclear Engineering.
 Robbins, William G 1970 Emeritus Professor History.
 Roberts, Lani 1989 Emeritus Associate Professor Philosophy.
 Roberts, Paul A 1966 Emeritus Professor Zoology.
 Robinson, Alan H 1966 Emeritus Professor Nuclear Engineering.
 Robinson, Kay C 1970 Emeritus Associate Professor Admissions.
 Rogers, William R 1980 Emeritus Professor Crop and Soil Science.
 Rohrmann, George F 1979 Emeritus Professor Microbiology (Ag).
 Root, Jon R 1969 Emeritus Professor Extended Campus.
 Rosenfeld, Charles L 1974 Emeritus Professor Earth, Ocean & Atmo Sci.
 Rosenkoetter, Sharon E 1999 Emeritus Associate Professor Sch of Soc/Bhav Hlth Sci.
 Ross, Jackson W 1960 Emeritus Professor Extension Service Prgram.
 Ross, Richard E 1970 Emeritus Professor Anthropology.
 Rossignol, Annette M 1988 Emeritus Professor Sch of Soc/Bhav Hlth Sci.
 Rowe, Kenneth E 1965 Emeritus Professor Statistics (Science).
 Rowley, Marvin L 1973 Emeritus Senior Instructor I College of Forestry Adm.
 Ruben, John A 1975 Emeritus Professor Zoology.
 Rudd, Oris C 1963 Emeritus Professor Extension Service Prgram.
 Rudd, Walter G 1985 Emeritus Professor Sch Elect Engr/Comp Sci.
 Russell, Sterling A 1963 Emeritus Senior Instructor I Ag Botany/Plant Path.
 Rutledge, James A 1994 Emeritus Professor College of Education.

Rydrych, Donald J 1965 Emeritus Professor
Columbia Basin Exp Sta.
Rykbost, Kenneth A 1987 Emeritus Professor
Crop and Soil Science.

S

- Samuel, Scott R 1985 Emeritus Senior
Instructor I Foreign Langs and Lits.
Sanchez, Alex A 1998 Emeritus Professor
College of Education.
Sanders Jr, Raymond 1967 Emeritus Professor
Counseling Center.
Sanderson, Donald R 1968 Emeritus Associate
Professor Memorial Union.
Sandine, William E 1960 Emeritus Professor
Microbiology (Science).
Saugen, John L 1964 Emeritus Associate
Professor Sch Elect Engr/Comp Sci.
Savage, Thomas F 1982 Emeritus Professor
Animal & Rnglnd Sciences.
Savonen, Carol A 1988 Emeritus Associate
Professor Ag Communications.
Sawer, Barbara J 1974 Emeritus Professor
Extension 4-H Youth.
Scanlan, Michael J 1981 Emeritus Associate
Professor Philosophy.
Scanlan, Richard A 1964 Emeritus Professor
Food Science and Techno.
Scanlan, Richard A 1964 Emeritus VP for
Research.
Schafer, Daniel W 1982 Emeritus Professor
Statistics (Science).
Schaffer, Kay F 1994 Dean Emeritus Liberal
Arts Admin.
Schaffer, Kay F 1994 Emeritus Professor Sch of
Psychological Sci.
Schauber, Ann C 1978 Emeritus Professor
Liberal Arts Admin.
Schaup, Henry W 1973 Emeritus Professor
Biochem/Biophysics.
Schimerlik, Michael I 1978 Emeritus Professor
Biochem/Biophysics.
Schmall, Vicki L 1972 Emeritus Professor
Extension Service Prgram.
Schmisser, Wilson E 1971 Emeritus Associate
Professor Applied Economics.
Schmitt, Roman A 1966 Emeritus Professor
Chemistry.
Schneider, Gary L 1964 Emeritus Professor
Extension Service Prgram.
Schori, Richard M 1978 Emeritus Professor
Mathematics.
Schroeder, Jane F 1960 Emeritus Professor
Extension Service Prgram.
Schroeder, W Lee 1967 Emeritus Professor
College of Engineering.
Schroeder, Walter G 1957 Emeritus Professor
Extension Service Prgram.
Schuyler, Michael W 1980 Emeritus Professor
Chemistry.
Schwartz, Robert B 1978 Emeritus Professor
Sch of Wrtg Lit & Film.
Scott, Nan H 1972 Emeritus Senior Instructor I
Crop and Soil Science.
Scott, Shirley R 1988 Emeritus Assistant
Professor Library.
Seim, Wayne K 1969 Emeritus Senior
Instructor I Fisheries and Wildlife.
Selivonchick, Daniel P 1976 Emeritus Professor
Food Science and Techno.
Seville, Mary A 1983 Emeritus Associate
Professor College of Business.
Sharrow, Steven H 1976 Emeritus Professor
Animal & Rnglnd Sciences.
Shearer, Marvin 1968 Emeritus Professor Biol
& Ecol Engineering.
Sheets, Willis A 1959 Emeritus Professor
Extension Service Prgram.
Sherr, Barry F 1990 Emeritus Professor Earth,
Ocean & Atmo Sci.
Sherr, Evelyn B 1990 Emeritus Professor Earth,
Ocean & Atmo Sci.
Shibley, Gloria O 1965 Emeritus Professor
Extension Service Prgram.
Shindler, Bruce A 1988 Emeritus Professor
Forest Ecosyst & Society.
Shirley, Robert E 1967 Emeritus Associate
Professor College of Business-Adm.
Shively, Stanley E 1970 Emeritus Associate
Professor Sociology.
Shumway, Sallyann M 1963 Emeritus Associate
Professor EXT Fam/CommHlth OnCmps.
Siemens, Philip J 1988 Emeritus Professor
Physics.
Simko, Benedict C 1978 Emeritus Professor
Crop and Soil Science.
Simmons, Dale D 1963 Emeritus Professor Sch
of Psychological Sci.
Simon-Brown, Viviane M 1994 Emeritus
Professor Forest Ecosyst & Society.
Simoneit, Bernd R 1981 Emeritus Professor
Earth, Ocean & Atmo Sci.
Simonson, Gerald H 1961 Emeritus Professor
Crop and Soil Science.
Sisson, Carol F 1975 Emeritus Associate
Professor College of Education.
Sjogren, Christine O 1960 Emeritus Professor
Foreign Langs and Lits.
Skubinna, Tammy K 1983 Emeritus Professor
Sch of Soc/Bhav Hlth Sci.
Sleight, Arthur W 1989 Emeritus Professor
Chemistry.
Slocombe, Edmond N 1986 Emeritus Associate
Professor Extension Service Prgram.
Slotta, Larry S 1962 Emeritus Professor Sch of
Civil/Constr Engr.
Small, Lawrence F 1961 Emeritus Professor
Earth, Ocean & Atmo Sci.
Smiley, William E 1987 Emeritus Associate
Professor College of Education.
Smith, Alvin W 1980 Emeritus Professor
Veterinary Medicine.
Smith, Bradford B 1983 Emeritus Professor
Veterinary Medicine.
Smith, Charles E 1961 Emeritus Professor Sch
of Mech/Ind/Mfg Engr.
Smith, Courtland L 1969 Emeritus Professor
Anthropology.
Smith, Frederick J 1964 Emeritus Professor Sea
Grant.
Smith, J W 1965 Emeritus Professor
Mathematics.
Smith, Margaret M 1977 Emeritus Associate
Professor Sch of Soc/Bhav Hlth Sci.
Smith, Orrin E 1980 Emeritus Professor
Horticulture Extension.
Smith, Robert L 1979 Emeritus Professor
Extension Service Prgram.
Smith, Robert L 1964 Emeritus Professor Earth,
Ocean & Atmo Sci.
Smythe, Robert T 1998 Emeritus Professor
Statistics (Science).
Snow, Christine M 1990 Emeritus Professor Sch
of Bio/Pop Hlth Sci.
Snyder, Stanley P 1985 Emeritus Professor
Veterinary Medicine.
Soeldner, Alfred H 1966 Emeritus Senior
Instructor I Ag Botany/Plant Path.
Sollins, Phillip 1976 Emeritus Professor Forest
Ecosyst & Society.
Sollitt, Charles K 1972 Emeritus Professor Sch
of Civil/Constr Engr.
Solmon, Donald C 1977 Emeritus Professor
Mathematics.
Sorenson, Gary W 1968 Emeritus Associate
Professor Economics.
Soule, B L 1967 Emeritus Associate Professor
College of Business.
Spencer, James B 1963 Emeritus Associate
Professor History.
Sponenburgh, M R 1961 Emeritus Professor
Art.
Spotts, Robert A 1978 Emeritus Professor Ag
Botany/Plant Path.
Sredl, Henry J 1983 Emeritus Professor College
of Education.
Stadsvold, Cyril V 1963 Emeritus Associate
Professor Art.
Stang, Jack R 1976 Emeritus Associate Professor
Horticulture.
Stanger Jr, Charles E 1973 Emeritus Professor
Malheur Exp Sta.
Staton, Maryanne K 1964 Emeritus Professor
Sch of Soc/Bhav Hlth Sci.
Stebbins, Robert L 1962 Emeritus Professor
Horticulture.
Steggell, Carmen D 1998 Emeritus Associate
Professor College of Business.
Stehr, Christian P 1969 Emeritus Professor
Foreign Langs and Lits.
Stennett, Douglass J 1974 Emeritus Professor
Pharmacy.
Stephen, William P 1953 Emeritus Professor
Crop and Soil Science.
Stetz, Albert W 1976 Emeritus Professor
Physics.
Stevens, Joe B 1966 Emeritus Professor Applied
Economics.
Stiehl, Ruth E 1972 Emeritus Professor College
of Education.
Stoltz, Michael A 1979 Emeritus Professor Crop
and Soil Science.
Stone, Solon A 1957 Emeritus College of
Engineering.
Stone, Solon A 1957 Emeritus Professor Sch
Elect Engr/Comp Sci.
Stonehill, Arthur I 1966 Emeritus Professor
College of Business.
Storm, Robert M 1946 Emeritus Professor
Zoology.
Stormshak, Fredrick 1968 Emeritus Professor
Animal & Rnglnd Sciences.
Strandberg, Lee R 1975 Emeritus Professor
Pharmacy.

Sugawara, Alan I 1968 Emeritus Professor Sch of Soc/Bhav Hlth Sci.

Sullivan, David R 1981 Emeritus Associate Professor College of Business.

Sunderland, Paul L 1986 Emeritus Associate Professor General Agriculture.

Suttie, Sandra J 1969 Emeritus Associate Professor Sch of Bio/Pop Hlth Sci.

Swan, Patricia L 1978 Emeritus Associate Professor EXT Fam/CommHlth OnCmps.

Swanson, Lloyd V 1970 Emeritus Professor Animal & Rnglnd Sciences.

Swenson, L W 1968 Emeritus Professor Physics.

T

Tappeiner, John C 1980 Emeritus Professor Forest Eng/Resources/Mgmt.

Taubeneck, William H 1955 Emeritus Professor Earth, Ocean & Atmo Sci.

Taylor, Edward M 1966 Emeritus Professor Earth, Ocean & Atmo Sci.

Taysom, Wayne P 1951 Emeritus Professor Art.

Tentchoff, Dorice M 1977 Emeritus Assistant Professor Anthropology.

Thienes, John R 1968 Emeritus Professor Extension Service Prgam.

Thies, Richard W 1968 Emeritus Professor Chemistry.

Thomas, Darrah 1971 Emeritus Professor Chemistry.

Thomas, David R 1967 Emeritus Professor Statistics (Science).

Thompson, James M 1989 Emeritus Associate Professor Animal & Rnglnd Sci Extn.

Thompson, Maxine M 1964 Emeritus Professor Horticulture.

Thornburgh, George E 1952 Emeritus Professor Sch of Mech/Ind/Mfg Engr.

Tillson, Gregory D 1970 Emeritus Professor Extension Service Admin.

Timm, Karen I 1983 Emeritus Associate Professor Veterinary Medicine.

Tinsley, Ian J 1957 Emeritus Professor Enviro/Molecular Toxic.

Todd, Rodney M 1974 Emeritus Professor Crop and Soil Science.

Torbeck, Frances M 1958 Emeritus Associate Professor Extension Service Prgam.

Torpey, James E 1971 Emeritus Associate Professor Sch of Bio/Pop Hlth Sci.

Towey, Richard E 1962 Emeritus Professor Economics.

Tricker, Raymond 1989 Emeritus Associate Professor Sch of Soc/Bhav Hlth Sci.

Trow, Clifford W 1970 Emeritus Professor History.

Trow, Jo Anne 1965 Vice Provost Emeritus Professor Vice Prov/Student Aff.

Trow, Jo Anne 1965 Emeritus Professor College of Education.

Tubb, Richard A 1975 Emeritus Professor Fisheries and Wildlife.

Tucker, Sylvia B 1975 Dean Emeritus Professor College of Education.

Turner, Harley A 1974 Emeritus Associate Professor EOARC - Burns Exp Sta.

U

Ullman, David G 1984 Emeritus Professor Sch of Mech/Ind/Mfg Engr.

Unsworth, Michael H 1992 Emeritus Professor Earth, Ocean & Atmo Sci.

V

Valenti, Paul B 1949 Emeritus Professor Intercolleg Athletics.

VanDehey, Norbert J 1998 Emeritus Professor College of Ag Extension.

VanDyke, Henry 1960 Emeritus Professor Biology.

VanHolde, Ken E 1967 Emeritus Professor Biochem/Biophysics.

VanVliet, Antone C 1959 Emeritus Professor Career Services.

Vandewater, John G 1976 Emeritus Professor Int'l Degree & Ed Abroad.

Vanvechten, James A 1985 Emeritus Professor Sch Elect Engr/Comp Sci.

Vars Jr, R C 1966 Emeritus Professor Economics.

Vavra, Martin 1971 Emeritus Professor Animal & Rnglnd Sciences.

Verzasconi, Ray A 1967 Emeritus Professor Foreign Langs and Lits.

Vinson, Ted S 1976 Emeritus Professor Sch of Civil/Constr Engr.

Volk, Veril V 1966 Emeritus Professor Crop and Soil Science.

Vomocil, James A 1967 Emeritus Professor Crop and Soil Science.

Vonborstel Jr, Frank 1952 Emeritus Professor Extension Service Prgam.

W

Wagener, Joseph M 1969 Emeritus Professor Counseling Center.

Walstad, John D 1980 Emeritus Professor Forest Eng/Resources/Mgmt.

Ward, Chris L 1986 Emeritus Associate Professor College of Education.

Waring, Richard H 1963 Emeritus Professor Forest Ecosyst & Society.

Warren Jr, William W 1991 Emeritus Professor Physics.

Wasserman, Allen L 1965 Emeritus Professor Physics.

Watrous, Barbara J 1981 Emeritus Professor Vet Clinical Sciences.

Wax, Darold D 1963 Emeritus Professor History.

Weaver, Roger K 1962 Emeritus Professor Sch of Wrtg Lit & Film.

Weber, Dale W 1976 Emeritus Professor Animal & Rnglnd Sciences.

Weber, Lavern J 1969 Associate Dean Emeritus College of Ag Admin.

Weber, Lavern J 1969 Emeritus Professor Fisheries and Wildlife.

Weber, Leonard J 1957 Emeritus Professor College of Engineering.

Weinman, Richard J 1967 Emeritus Professor Speech Communication.

Weiser, Conrad J 1971 Emeritus Professor Horticulture.

Weiser, Conrad J 1971 Dean Emeritus College of Ag Admin.

Wess, Robert V 1977 Emeritus Associate Professor Sch of Wrtg Lit & Film.

West, Thomas M 1976 Emeritus Professor Sch of Mech/Ind/Mfg Engr.

Westall, John C 1980 Emeritus Professor Chemistry.

Westwood, Melvin N 1960 Emeritus Professor Horticulture.

Whanger, Philip D 1966 Emeritus Professor Enviro/Molecular Toxic.

Wheeler, Patricia A 1982 Emeritus Professor Earth, Ocean & Atmo Sci.

Wheeler, William P 1956 Emeritus Professor Forest Ecosyst & Society.

White, James D 1971 Emeritus Professor Chemistry.

Widicus, Wilbur W 1964 Emeritus Professor College of Business.

Wilcox, Bert G 1962 Emeritus Professor Extension Service Admin.

Wilkins, Bill 1961 Emeritus Professor Economics.

Wilkins, Bill 1961 Dean Emeritus Liberal Arts Admin.

William, Ray D 1979 Emeritus Professor Horticulture Extension.

Williamson, Kenneth J 1972 Emeritus Professor Sch of Civil/Constr Engr.

Willis, David L 1962 Emeritus Professor Biology.

Wilson, Howard L 1973 Emeritus Professor Mathematics.

Wilson, James B 1973 Emeritus Professor Wood Science/Engr.

Wilson, Mark V 1983 Emeritus Associate Professor Ag Botany/Plant Path.

Wilson, Robert E 1959 Emeritus Professor Sch of Mech/Ind/Mfg Engr.

Winkler Jr, William 1957 Emeritus Associate Professor Sch of Bio/Pop Hlth Sci.

Winters, Eugene P 1963 Emeritus Professor Extension Service Prgam.

Wiprud, Theodore F 1964 Emeritus Professor Art.

Wirth, Donald S 1971 Emeritus Associate Professor Alumni Relations.

Witt, James M 1966 Emeritus Professor Enviro/Molecular Toxic.

Witters, Robert E 1977 Emeritus Professor College of Ag Admin.

Wogaman, Mariol R 1968 Emeritus Associate Professor Library.

Wong, Allen Q 1967 Emeritus Professor Art.

Wong, Sally 1973 Emeritus Assistant Professor Counseling Center.

Wood, Terence M 1985 Emeritus Associate Professor Sch of Bio/Pop Hlth Sci.

Woodard, Ernest S 1974 Emeritus Associate Professor Extension Service Prgam.

Woodburn, Margy J 1969 Emeritus Professor Sch of Bio/Pop Hlth Sci.

Wrolstad, Ronald E 1965 Emeritus Professor Food Science and Techno.

Y

- Yates, Tom 1963 Emeritus Professor Information Services.
- Yeats, Robert 1977 Emeritus Professor Earth, Ocean & Atmo Sci.
- Yonker, Nicholas J 1962 Emeritus Professor Philosophy.
- Yost, Melvin L 1967 Emeritus Assistant Professor Information Services.
- Youmans, Russell C 1966 Emeritus Professor Applied Economics.
- Young, John A 1972 Emeritus Professor Anthropology.
- Young, Roy A 1948 Emeritus Professor Ag Botany/Plant Path.
- Young, William C 1977 Emeritus Professor Crop and Soil Science.
- Youngberg, Harold W 1960 Emeritus Professor Crop and Soil Science.
- Yungen, John A 1950 Emeritus Professor Southern Oregon Exp Sta.

Z

- Zaerr, Joe B 1965 Emeritus Professor Forest Ecosyst & Society.
- Zaneveld, J Ronald V 1971 Emeritus Professor Earth, Ocean & Atmo Sci.
- Zimmerman, Martin J 1960 Emeritus Professor Crop/Soil Sci Extension.
- Zinn, Thomas G 1962 Emeritus Professor Extension Service Admin.
- Zobel, Donald B 1968 Emeritus Professor Ag Botany/Plant Path.
- Zollinger, William A 1985 Emeritus Associate Professor Animal & Rnglnd Sciences.

FACULTY

This faculty roster includes the Oregon State University faculty who serve the university, its students, and constituents through one or more of the following activities: instruction, research, extension, and administration. Also listed are a few on-campus staff members with faculty appointments in other state system agencies. The names of courtesy faculty members, individuals who provide voluntary services to the instructional and research programs of the university, appear in the faculty listings of individual departments or colleges.

The following abbreviations are used: Prof-Professor; Assoc Prof-Associate Professor; Asst Prof-Assistant Professor; Inst-Instructor; Res Assoc-Research Associate; Sr Inst-Senior Instructor; Sr Faculty Res Asst-Senior Faculty Research Assistant; Faculty Res Asst-Faculty Research Assistant; Extn-Oregon State University Extension Service.

A

- Aaron, Wendy R 2012 Assistant Professor College of Education. BA Univ of Cal-Santa Cruz 2001; MA Univ of Cal-Los Angeles 2004; PHD Univ of Michigan-Ann Arbor 2011
- Abbott, Mark R 1988 Dean Earth, Ocean & Atmo Sci. BS Univ of Cal-Berkeley 1974; PHD Univ of California-Davis 1978
- Abbott, Mark R 1988 Professor Earth, Ocean & Atmo Sci. BS Univ of Cal-Berkeley 1974; PHD Univ of California-Davis 1978
- Ackers, Steven H 2000 Senior Faculty Research Asst I Fisheries and Wildlife. PHD Northern Arizona University 1997
- Adams, Paul W 1980 Ext Watershed Spec Professor Forest Eng/Resources/Mgmt. BS University of Vermont 1975; MS Univ of Michigan-Ann Arbor 1978; PHD Univ of Michigan-Ann Arbor 1980
- Adams, Terry 1986 Instructor College of Education. BA University of Oklahoma Norman 1978; BA Oregon State University 1989; JD University of Oklahoma Norman 1981
- Adkins, Jessica Y 1999 Senior Faculty Research Asst I Fisheries and Wildlife. BS Western Washington University 1997; MS Oregon State University 2003
- Adler, Rebecca A 2014 Instructor- ESL INTO OSU Program. BA Cal State Univ-Sacramento 2005; MA Cal State Univ-Sacramento 2011
- Aduviri, Amas 2005 Dir-CAMP Educ Opportunities Prgm. BA Foreign Institution 1989; MBA Andrews University 2000
- Aduviri, Cheridy L 2006 Instructor College of Education. BA Eastern Washington University 1996; MA Andrews University 2000
- Agne, Michelle C 2010 Faculty Research Assistant Forest Eng/Resources/Mgmt. BS Western Washington University 2009
- Ahern, Katherine 2011 Instructor Ext Deschutes Co Office. BS University of Puget Sound 1987; MA Oklahoma State Univ-Main 1993
- Ahern, Kevin G 1989 Dir-Undergraduate Research Acad Success & Engage Adm University Honors College Faculty. BS Oklahoma State Univ-Main 1976; MS Oklahoma State Univ-Main 1981; PHD Oregon State University 1986
- Ahern, Kevin G 1989 Senior Instructor I Biochem/Biophysics University Honors College Faculty. BS Oklahoma State Univ-Main 1976; MS Oklahoma State Univ-Main 1981; PHD Oregon State University 1986
- Ahluwalia, Sangeeta 2013 Assistant Professor Sch of Soc/Bhav Hlth Sci. MPH Univ of Cal-Los Angeles 2001; MA Univ of Cal-Berkeley 2007; PHD Univ of Cal-Berkeley 2009
- Ahrens, Glenn R 2001 Instructor Ext Clackamas Co Office. BS Humboldt State University 1982; MS Oregon State University 1990
- Akan, Cigdem 2012 Research Associate (Post Doc) Earth, Ocean & Atmo Sci. BS Foreign Institution 2005; MS Foreign Institution 2007; PHD University of South Florida 2012
- Akins, Brielyn N 2010 Instructor Women Studies. BA Washington State University 1998; MA Victoria University of Welling 2006
- Akins, Scott M 2004 Associate Professor Sociology University Honors College Faculty. BA Northern Arizona University 1994; MA Washington State University 1999; PHD Washington State University 2002
- Akkaraju, Padmaja 1999 Coordinator/ Advisor Sch Elect Engr/Comp Sci. BS Sri Venkateswara University 1983; MS Sri Venkateswara University 1985; PHD Indian Institute of Technology 1991
- Akroyd, Christopher L 2012 Assistant Professor College of Business. MS University of Sydney 1995; MBA Kobe University 2000; PHD Univ of Auckland 2007
- Al-Hawamdeh, Imad 2012 Instructor INTO OSU Program. BA Unknown College 2001; MA Indiana Univ of Pennsylvania 2010
- Alani, Wathah G 2010 Assistant Professor Pharmacy. BS University of Baghdad 1989; MS University of Baghdad 1995; PHD Univ of Wisconsin-Madison 2007
- Albers, Heidi J 2004 Professor Forest Ecosyst & Society. BS Duke University 1985; MED Yale University 1987; PHD Berkeley City College 2002
- Albert, Dennis A 2004 Assistant Professor (Sr Res) Horticulture. BS Univ of Michigan-Ann Arbor 1981; MS Univ of Michigan-Ann Arbor 1983; PHD Univ of Michigan-Ann Arbor 1990
- Albertani, Roberto 2010 Associate Professor Sch of Mech/Ind/Mfg Engr University Honors College Faculty. MS Foreign Institution 1980; PHD University of Florida 2005
- Albrecht, Andrew S 2004 Faculty Research Assistant Ag Botany/Plant Path. BA Pacific Lutheran University 2006
- Albrecht, Kristin Frost B 2009 Instructor Ext Clatsop Co Office. BA Willamette University 1979; MA Pacific University 1991

- Alcantar, Benjamin E 2011 Instructor Vet Biomedical Science. DVM Autonomous Univ St of Mexico 2005
- Alcorn, Kay A 2013 Instructor- ESL INTO OSU Program. BS San Diego State University 1986; MS School for Internatl Training 1997
- Alden, Catherine A 2006 Instructor College of Education. BA University of Oregon 1970; MA University of Oregon 1974
- Aldwin, Carolyn M 2004 Professor Sch of Soc/ Bhav Hlth Sci University Honors College Faculty. BA Clark University 1974; PHD Univ of Cal-San Francisco 1982
- Alexander, Rise J 1990 Head Coach-Women's Golf Intercolleg Athletics. BS Oregon State University 1977
- Alger, Marlys L 2012 Instructor Acad Prog/ Student Aff. BS Oregon State University 1986; MS Oregon State University 1993
- Aljets, Alexandria D 2007 Advisor-Academic/ Pre-Health College of Science Admin. BS Oregon State University 2010; MA The Ohio State Univ Main 2012
- Allan, Andrea M 2005 Research Associate (Post Doc) Earth, Ocean & Atmo Sci. BS Penn State Univ-Main Campus 2005; MS Oregon State University 2007; PHD Oregon State University 2012
- Allan, Robert S 2004 Dir-Student Services Earth, Ocean & Atmo Sci. BA Wittenberg University 1995; MA Minnesota State Univ-Mankato 2000
- Alleau, Yvan 1999 Senior Faculty Research Asst I Earth, Ocean & Atmo Sci. BS Universite of Poitiers 1997; MOCE Oregon State University 2002
- Allen, Nancy L 1999 Head Advisor Fisheries and Wildlife. BS Oregon State University 1985; MS Oregon State University 2001
- Allred, Ann H 2010 Instructor Acad Prog/ Student Aff. BA Ohio University-Main Campus 1968; MAT Eastern Oregon University 2001
- Altshin, Andrew M 2013 Instructor Crop/Soil Sci Extension. BS Oregon State University 2006
- Alvarez, Jackie 2008 Director-Counseling/ Psych Svcs Counseling Center. BA Unknown College 1985; MA Ohio Dominican University 1989; PHD Ohio Dominican University 1992
- Amarasekare, Kaushalya G 2009 Research Associate (Post Doc) Mid-Columbia Exp Sta. BS University of Peradeniya 1993; MS Oklahoma State Univ-Main 2002; PHD University of Florida 2007
- Amarasinghe, Vindhya 2008 Research Associate Ag Botany/Plant Path. BS Unknown College 10 1983; PHD Australian National University 1989
- Amele, Melinda R 1999 Instructor (PAC) Physical Activity Courses. BS Oregon State University 1980; MS Portland State University 1988
- Amon, Ean A 2004 Assistant Professor (Sr Res) Sch Elect Engr/Comp Sci. BS Oregon State University 2004; MS Oregon State University 2007; PHD Oregon State University 2010
- Anchell, Stephen G 2012 Instructor Art.
- Andersen, Daniel 2012 Instructor Political Science. BS Western Washington University 2005; MS University of Oregon 2008; PHD University of Oregon 2012
- Andersen, Jayne 2006 Advisor-Academic College of Business. BS Purdue University Main Campus 1983; MBA Oregon State University 1992
- Anderson, Ashleigh N 2007 Advisor-Academic Liberal Arts Admin. BA Univ of Cal-Riverside 2007
- Anderson, Kim A 1999 Professor Enviro/ Molecular Toxic. BS University of Oregon 1981; BS Boise State University 1985; PHD Washington State University 1989
- Anderson, Lorinda W 2011 Instructor Pharmacy. D PHAR University of Utah 2010
- Anderson, Nicole 2009 Assistant Professor Ext Yamhill Co Office. BS Xavier University 2003; MS Washington State University 2006
- Anderson, T Anne 2010 Professional Instructor Speech Communication. BS Portland State University 1997; MA Oregon State University 2013
- Anderson, Wayne C 1986 Professor Sch of Wrtg Lit & Film University Honors College Faculty. BA Gonzaga University 1977; MA University of Washington 1979; MA Mount Angel Seminary 1997; PHD University of Washington 1983
- Anderson, William J 2011 Instructor Applied Economics. BS University of Rhode Island 2011; MS Oregon State University 2013
- Andrew, Isaac D 2010 Instructor Music. BMUS Azusa Pacific University 2005; MM Cal State Univ-Long Beach 2010
- Andrews, Lawrence S 1993 Senior Faculty Research Asst I Fisheries and Wildlife. BS University of New Mexico 1988
- Andrews, Nicholas 2005 Senior Instructor I Ext No Willamette Co Off. BS Oregon State University 1991; MS Univ of Reading 1995
- Angelo, Giana 2011 Research Associate Linus Pauling Institute. BA Cornell University-Ithaca 1995; MS Tufts University 2000; PHD Tufts University 2005
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- Anzinger, Dawn L 1998 Senior Instructor I Forest Ecosyst & Society. BS Oregon State University 1999; MS Oregon State University 2002
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- Arbuckle, Nancy 2013 Faculty Research Assistant Fisheries and Wildlife. BS Long Island Univ-Southampton 2003; PHD Texas A&M Univ-College Station 2012
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- Argerich, Alba 2009 Assistant Professor (Sr Res) Forest Eng/Resources/Mgmt. BS Foreign Institution 1998; MS Foreign Institution 2002; PHD Univ of Barcelona 2009
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- Auerbach, Marisha 2011 Lecturer Horticulture. BA Evergreen State College 1998
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- Baggott, John B 1984 Assistant Professor EXT 4-H YouthDev OnCmps. BS Michigan State University 1975; MS Michigan State University 1980
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- Benoit-Bird, Kelly J 2004 Associate Professor Earth, Ocean & Atmo Sci. BS Brown University 1998; PHD Univ of Hawaii at Manoa 2003
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- Bentley-Townlin, Tracy L 1990 Interim Dean-Student Life Dean of Students. BA University of New Mexico 1987; BS University of New Mexico 1987; MED Oregon State University 1994; PHD Oregon State University 2002
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- Berger, David G 2008 Associate Professor College of Business. BS Washington State University 2003; PHD Washington State University 2008
- Bermudez, Luiz E 2002 Department Head Veterinary Medicine University Honors College Faculty. MD Federal Univ of Rio de Janeiro 1978
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- Blair Jr, Brantley B 2008 Advisor-Academic Forest Ecosyst & Society. BS Univ of Mary Hardin-Baylor 1999; BS Oregon State University 2010
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- Brandt, Stephen B 2009 Professor Fisheries and Wildlife. BA Univ of Wisconsin-Madison 1972; MS Univ of Wisconsin-Madison 1975; PHD Univ of Wisconsin-Madison 1978
- Branscum, Adam J 2010 Associate Professor Sch of Bio/Pop Hlth Sci. MS Cal State University-East Bay 2000; MS Univ of California-Davis 2005; PHD Univ of California-Davis 2005
- Brasted-Maki, Donald M 2008 Instructor Sch of Wrtg Lit & Film. BS Univ of Minnesota-Twin Cities 1980; MA Middlebury College 1986; PHD Temple University 2001
- Brauner, David R 1975 Professor Anthropology. BA Washington State University 1969; MA Washington State University 1972; PHD Washington State University 1976
- Braunworth Jr, William S 1986 Associate Professor Horticulture. BS Colorado State University 1975; MS Colorado State University 1977; PHD Oregon State University 1986
- Braunworth Jr, William S 1986 Department Head Horticulture. BS Colorado State University 1975; MS Colorado State University 1977; PHD Oregon State University 1986
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- Braverman, Marc T 2005 Professor EXT Fam/CommHlth OnCmps. BA SUNY at Buffalo 1972; MS Univ of Wisconsin-Madison 1975; PHD Univ of Wisconsin-Madison 1982
- Bray, Tammy M 2002 Dean Public Hlth/HumanSci Adm. BS Fu-Jen Univ Chinese Language I 1967; MS Washington State University 1971; PHD Washington State University 1974
- Bray, Tammy M 2002 Professor Sch of Bio/Pop Hlth Sci. BS Fu-Jen Univ Chinese Language I 1967; MS Washington State University 1971; PHD Washington State University 1974
- Breece, Carolyn 2004 Faculty Research Assistant Horticulture. BS University of Oregon 1999; MS Northern Arizona University 2006
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- Brewer, Linda J 2000 Senior Faculty Research Asst I Horticulture. BA Univ of Missouri-Kansas City 1974; MS Oregon State University 2001
- Bridges, Laurie M 1997 Assistant Professor Library. BS Univ of Nebraska-Lincoln 1995; MS Oregon State University 1999; MLS Seattle University 2007
- Brisker, Kathy J 2010 Instructor (PAC) Physical ActivityCourses. MFA Oregon State University 2010
- Brock, Isabelle T 2006 Instructor Sch of Wrtg Lit & Film. BA Susquehanna University 2004; MFA Oregon State University 0200
- Brody, Barbara S 2009 Assistant Professor Ext Malheur Co Office. BS Cal State Polytechnic - Pomona 1997; MS Cal State Polytechnic - Pomona 1997
- Brook, Edward J 1996 Professor Earth, Ocean & Atmo Sci. BS Duke University 1985; MS University of Montana 1988; PHD Massachusetts Inst of Technolo 1993
- Brooke, Sandra L 1992 Associate Professor Acad Prog/Student Aff. BFA University of Oregon 1972; MFA University of Oregon 1993
- Brooke, Sandra L 1992 Associate Professor Art. BFA University of Oregon 1972; MFA University of Oregon 1993
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- Brooks, Raymond M 1997 Professor College of Business University Honors College Faculty. BS Oregon State University 1973; MBA Kansas State University 1978; MS Washington University-St Louis 1990; PHD Washington University-St Louis 1991
- Broome, Jon B 2011 Instructor College of Business. BS United States Military Academy 1982; MBA University of Oregon 1991
- Brouwers, Mariette 1985 Psychologist Associate Professor Counseling Center. BA Univ of Colorado System 1975; MA Washington State University 1984; PHD Washington State University 1985
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- Brown, Nicole A 2001 Instructor College of Business. BA Linfield College 1999; MA Oregon State University 2004
- Brown, Preston H 2010 Faculty Research Assistant Mid-Columbia Exp Sta. BS Virginia Polytechnic Institute 2005; MS Virginia Polytechnic Institute 2009
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- Brummer, Fara A 2004 Senior Instructor I Ext Warm Springs. BS Westchester Community College 1990; MS Oregon State University 2009
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- Bubl, Charles E 1978 Associate Professor Ext Columbia Co Office. BS Oregon State University 1973; MS Oregon State University 1978
- Buchanan, Edward A 2003 Faculty Research Assistant Ag Botany/Plant Path. BS Oregon State University 2013
- Buck, Stefanie 2009 Assistant Professor Library. BA Iowa State University 1988; MLS Univ of Hawaii at Manoa 1993; MS Univ of Hawaii at Manoa 1993
- Buckles, Gerri 2005 Faculty Research Assistant Microbiology (Ag). BS Tarleton State University 1988
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- Cervantes, Brandy T 1998 Research Associate Earth, Ocean & Atmo Sci. BS Univ of Michigan-Ann Arbor 1997; PHD Oregon State University 2004
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- Chadwick, William 1989 Professor (Sr Res) CIMRS (Inst/Marine Res). BA Colorado College 1981; PHD Univ of Cal-Santa Barbara 1988
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- Chan, Francis 2001 Assistant Professor (Sr Res) Zoology University Honors College Faculty. BA Hampshire College 1993; PHD Cornell University-Ithaca 2001
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- Chaney, Raymond J 2012 Instructor Sch Elect Engr/Comp Sci. BS Texas State University 1985; MS Rice University 1987
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- Chang, Chih-hung 2000 Professor Sch of Chem/Bio/Envr Eng University Honors College Faculty. BS National Taiwan University 1991; PHD University of Florida 1999
- Chang, Jeff H 2006 Associate Professor Ag Botany/Plant Path University Honors College Faculty. BS Univ of Minnesota-Twin Cities 1993; PHD Univ of California-Davis 1999
- Chaplen, Frank W 1996 Associate Professor Biol & Ecol Engineering University Honors College Faculty. BS Oregon State University 1989; PHD Univ of Wisconsin-Madison 1995
- Chaplin, Tanya A 1997 Head Coach-Women's Gymnastics Intercolleg Athletics. BA Univ of Cal-Los Angeles 1990
- Chapman, Christopher C 2006 Assistant Professor Music University Honors College Faculty. BMUS The Ohio State Univ Main 1992; MM The Ohio State Univ Main 1998
- Chappell, Marisa A 2005 Associate Professor History University Honors College Faculty. BA Emory University 1991; MA Northwestern University 1994; PHD Northwestern University 2002
- Chappell, Patrick E 2005 Assistant Professor Vet Biomedical Science University Honors College Faculty. BA Emory University 1991; PHD Northwestern University 1999
- Charlton, Brian A 1994 Instructor Klamath Basin Res&ExtCtr. BS Oregon State University 1994; MS Iowa State University 2006
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- Chavarria-Bechtel, Loren 1996 Assoc Dir-Outreach/Engagemnt Ctr Latino Styd&Engagemt. BA Oregon State University 1992; MA University of Arizona 1996
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- Chavez, Jenny A 2007 Instructor Ext Morrow County Office. BS Warner Pacific College 2003; MED Eastern Oregon University 2008
- Chen, Hsiou-Lien 1995 Associate Professor College of Business. BA Fu Jen Catholic University 1982; MS The Ohio State Univ Main 1990; PHD The Ohio State Univ Main 1995
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- Chen, Sandy C 2010 Assistant Professor Acad Prog/Student Aff. BA Beijing Foreign Studies Univer 1989; MS University of Nevada-Las Vegas 1999; PHD University of Nevada-Las Vegas 2003
- Chen, Sandy C 2010 Assistant Professor College of Business. BA Beijing Foreign Studies Univer 1989; MS University of Nevada-Las Vegas 1999; PHD University of Nevada-Las Vegas 2003
- Chen, Tony H 1986 Professor Horticulture. BS National Taiwan University 1974; MS U of Minnesota-Central Offices 1979; PHD U of Minnesota-Central Offices 1981
- Chen, Yong 2009 Assistant Professor Applied Economics. BA Beijing Foreign Studies Univer 1999; MA Peking University 2003; PHD The Ohio State Univ Main 2009
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- Cheng, Li-Jing 2013 Assistant Professor Sch Elect Engr/Comp Sci. PHD Univ of Michigan-Ann Arbor 2008
- Cheong, Ha Yeon 2009 Assistant Professor Chemistry University Honors College Faculty. PHD Cal State Univ-Los Angeles 2007
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- Cherian, Gita 1999 Associate Professor Animal & Rnglnd Sciences University Honors College Faculty. BVSC Kerala Agricultural University 1979; MS University of Alberta 1985; PHD University of Alberta 1993
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- Cheung, Itchung S 2007 Senior Instructor I Hatfield Marine Sci Ctr. BA Univ of Cal-Santa Cruz 1998; MS Univ of Cal-Santa Cruz 2007
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- Cowin, Kathleen M 2007 Assistant Professor College of Education. BA Univ of Cal-Santa Cruz 1976; MED Seattle University 1987; EDD Seattle University 2006
- Cox, Daniel T 2002 Professor Sch of Civil/Constr Engr University Honors College Faculty. BS University of Delaware 1987; MS University of Delaware 1989; PHD University of Delaware 1995
- Cox, Michelle J 2004 Instructor Acad Prog/Student Aff. BS Western Oregon University 1989; MA George Fox University 2003
- Cozzi, Elaine 2011 Assistant Professor Mathematics University Honors College Faculty. BA University of Virginia 2000; PHD Univ of Texas-Austin 2007
- Craig, A M 1976 Professor Vet Biomedical Science University Honors College Faculty. BA Oregon State University 1965; PHD Oregon State University 1970
- Craig, Ryan B 2006 Faculty Research Assistant Microbiology (Ag). BS Oregon State University 2006
- Cramer, Lori A 1993 Associate Professor Sociology University Honors College Faculty. BS Illinois State University 1985; MS Utah State University 1988; PHD Utah State University 1993
- Crangle, Kenneth 2012 Instructor College of Business. MBA University of Chicago 1984
- Crawford, Dana C 2001 Family Advocate Instructor Child Development Lab. BA Scripps College 2001
- Crawford, Seth S 1999 Instructor Sociology. BA Oregon State University 2003; MPP Oregon State University 2005
- Creighton, Janean 2010 Associate Professor(Extension) Forest Ecosyst & Society. BA Cornish College of the Arts 1983; MS Washington State University 1995; PHD Washington State University 2005
- Cross, Robin M 2000 Research Associate Applied Economics. BS Oregon State University 1997; PHD Oregon State University 2005
- Crowhurst, Rachel S 2008 Faculty Research Assistant Fisheries and Wildlife. BS Brock University 2005; MS Oregon State University 2012
- Crump, Byron C 2013 Associate Professor Earth, Ocean & Atmo Sci. BA Oberlin College 1990; MS University of Washington 1996; PHD University of Washington 1999
- Cuesta-Marcos, Alfonso 2007 Assistant Professor (Sr Res) Crop and Soil Science. MS Foreign Institution 2007; PHD Foreign Institution 2007
- Cunningham, Sarah E 2007 Instructor Anthropology. MAIS Ball State University 2006
- Curry, Daniel G 2006 Dir-Seed Services Crop and Soil Science. BS South Dakota State University 1977; MBA Iowa State University 1998
- Curry, Daniel G 2006 Supv-Farm Unit Corvallis Farm Unit. BS South Dakota State University 1977; MBA Iowa State University 1998
- Curry, Michael L 2000 Instructor College of Business. BS United States Military Academy 1986; MS University of Oregon 1996
- Curtis, Daniel W 2007 Senior Faculty Research Asst I Crop and Soil Science. BS Oregon State University 1985; MS Oregon State University 1988
- Curtis, Lawrence R 1999 Associate Dean College of Ag Admin. BS University of South Alabama 1974; MS University of South Alabama 1976; PHD Univ of Mississippi-Medical Ct 1980
- Curtis, Lawrence R 1999 Professor Enviro/Molecular Toxic. BS University of South Alabama 1974; MS University of South Alabama 1976; PHD Univ of Mississippi-Medical Ct 1980
- Curtis, Marc J 1996 Instructor Ag Botany/Plant Path. BS Southern New Hampshire Univ 1994; PHD Oregon State University 2003

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- Daley, Natalie 2012 Instructor Sch of Wrtg Lit & Film. BA City College of New York 1968; MA University of California 1970

- Dalton, Daniel T 2006 Faculty Research Assistant Horticulture. BS University of Wyoming 2005
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- Daly, Christopher 1990 Professor (Sr Res) Sch of Chem/Bio/Envr Eng. BS Univ of California-Davis 1978; MA Univ of Colorado-Boulder 1984; PHD Oregon State University 1994
- Daly, Elizabeth A 2003 Senior Faculty Research Asst I CIMRS (Inst/Marine Res). BS Univ of Maryland-College Park 1992
- Danelishvili, Lia 2002 Assistant Professor (Sr Res) Vet Biomedical Science. MS Foreign Institution 1995; PHD Foreign Institution 2000
- Daniels, Elizabeth 2011 Assistant Professor Acad Prog/Student Aff. BA Georgetown University 1998; MS Univ of Cal-Santa Cruz 2003; PHD Univ of Cal-Santa Cruz 2006
- Daniels, Elizabeth 2011 Assistant Professor Sch of Psychological Sci. BA Georgetown University 1998; MS Univ of Cal-Santa Cruz 2003; PHD Univ of Cal-Santa Cruz 2006
- Danley, Courtney 2010 Faculty Research Assistant Fisheries and Wildlife. BS Missouri State Univ 2000
- Dark, Catherine L 1990 Senior Instructor I Physical Activity Courses. BA Central Washington University 1975; MA Laban Centre for Movement & Da 1988
- Dascaliuc, Radu 2011 Assistant Professor Mathematics University Honors College Faculty. BS Foreign Institution 1997; MS Texas A&M Univ-College Station 1999; PHD Texas A&M Univ-College Station 2005
- Dasenko, Betsy J 2010 Instructor College of Education. BS Portland State University 2000; MAT Oregon State University 2001
- Dasenko, Mark A 1995 Senior Faculty Research Asst I Ctr Excellence Genome Res. BS Oregon State University 1999
- Davidson, James G 2010 Instructor Music. BA Willamette University 2003; MM Luther Seminary 2010
- Davidson, Timothy M 2011 Advisor-Academic Public Hlth/HumanSci Adm. BA Loyola Marymount University ; MA Humboldt State University
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- Davis, Curtiss O 2005 Professor (Sr Res) Earth, Ocean & Atmo Sci. BS Univ of California System 1966; MS University of Washington 1969; PHD University of Washington 1973
- Davis, Joel W 1993 Faculty Research Assistant Horticulture. BS Cal State Polytechnic - Pomona 1988; MS Oregon State University 1998
- Davis, Kent J 1999 Faculty Research Assistant Wood Science/Engr. BS Oregon State University 2001; MS Oregon State University 2005
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- Davison, Robert P 2005 Instructor Fisheries and Wildlife. BA Penn State Univ-Main Campus 1970; MS Univ of New Hampshire-Durham 1975; PHD Utah State University 1980
- Dawson, Patricia A 1988 Professor Ext Umatilla Co Office. BS University of Idaho 1981; MA Norwich University 1992
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- Dierksen, Karen P 2001 Research Associate (Post Doc) Microbiology (Science). BA Cal State Univ-Stanislaus 1991; PHD Oregon State University 1996
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- Dilles, John H 1986 Professor Earth, Ocean & Atmo Sci. BS Cal Institute of Tech 1975; MS Cal Institute of Tech 1976; PHD Stanford University 1984
- Dillon, Leanna K 2011 Advisor-Academic Univ Honors College University Honors College Faculty. BA Western Oregon University 2003; MA University of Denver 2011
- Dillon, William H 2006 Research Associate (Post Doc) Earth, Ocean & Atmo Sci. BS Evergreen State College 2005; PHD Oregon State University 2012
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- Dolan, Brian 2012 Assistant Professor Vet Biomedical Science. PHD Univ of Maryland-Baltimore 2006
- Dolan, Mark E 1997 Associate Professor Sch of Chem/Bio/Envr Eng. BS Oregon State University 1986; MS Oregon State University 1987; PHD Stanford University 1996
- Dolcini, M M 2005 Associate Professor Sch of Soc/Bhav Hlth Sci. BA Univ of Cal-Irvine 1979; PHD Univ of Cal-San Francisco 1990
- Dolgos, Michelle R 2012 Assistant Professor Chemistry University Honors College Faculty. BS Hillsdale College 2002; MS Univ of Tennessee-Knoxville 2006; PHD The Ohio State Univ Main 2009
- Dolja, Valerian V 1994 Professor Ag Botany/Plant Path. MS Moscow State University 1980; PHD Moscow State University 1980
- Dollar, Natalie J 1993 Assoc Dean - OSU Cascades Acad Prog/Student Aff. BA Mississippi State University 1985; MA Arizona State University 1988; PHD University of Washington 1993
- Dollar, Natalie J 1993 Associate Professor Speech Communication. BA Mississippi State University 1985; MA Arizona State University 1988; PHD University of Washington 1993
- Donato, Daniel C 2003 Research Associate (Post Doc) Forest Ecosyst & Society. BS University of Washington 1998; PHD Oregon State University 2008
- Donegan, Katherine Kelly K 2005 Advisor-Academic Horticulture. BS Univ of Cal-Santa Cruz 1984; MS Oregon State University 1987
- Doolen, Toni L 2000 Dean Univ Honors College University Honors College Faculty. BS Cornell University 1987; MS Stanford University 1991; PHD Oregon State University 2001
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- Dorkins, Anne C 2002 Senior Faculty Research Asst I Earth, Ocean & Atmo Sci. BS Univ of Colorado-Boulder 1979; MS Univ of Cal-San Diego 1984
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- Doyle, Jamie M 2008 Assistant Professor(Extension) Ext Coos County Office. BA Boston University 2000; MA University of Washington 2005
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- Dray, Tevian 1988 Professor Mathematics University Honors College Faculty. BS Massachusetts Inst of Technolo 1976; MA Univ of Cal-Berkeley 1977; PHD Univ of Cal-Berkeley 1981
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- Dreher, Theo W 1987 Professor Microbiology (Ag) University Honors College Faculty. BS University of Melbourne 1976; PHD University of Melbourne 1980
- Dreves, Amy J 1997 Assistant Professor (Sr Res) Crop and Soil Science. BS Colorado State University 1981; MS Oregon State University 1991; PHD Oregon State University 2006
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- Driscoll, Debra M 1984 Professor Ext Polk County Office. BS Minnesota State Univ-Mankato 1975; MS Univ of Wisconsin System 1982
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- Druckenmiller, Jenny D 1998 Instructor Foreign Langs and Lits. BA Oregon State University 2003; MS University of Oregon 2007
- Drummond, Robert J 2011 Instructor Sch of Wrtg Lit & Film University Honors College Faculty. BA Univ of Michigan-Ann Arbor 1996; MFA George Mason University 2006
- Du, Xiuning 2009 Research Associate CIMRS (Inst/Marine Res). BS Ningbo Univ 2008; PHD Oregon State University 2012

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- DuPont, Bryony L 2013 Assistant Professor Sch of Mech/Ind/Mfg Engr. BS Case Western Reserve Univ 2008; MS Carnegie Mellon University 2010; PHD Carnegie Mellon University 2013
- Duane, Maureen V 1997 Senior Faculty Research Asst I Forest Ecosyst & Society. BS Univ of Mary Washington 1996; MS Oregon State University 2001
- Duesterdieck, Katja F 2006 Assistant Professor Vet Clinical Sciences. MS Virginia Polytechnic Institute 2003; DVM Hanover School of Vet Medicine 1998; PHD Colorado State University 2007
- Duever, Teri J 2007 Advisor-Head-Academic Sch of Psychological Sci. EDM Oregon State University 2009
- Dugger, Bruce D 2002 Associate Professor Fisheries and Wildlife University Honors College Faculty. BS Univ of California-Davis 1986; MS Univ of Missouri-Columbia 1990; PHD Univ of Missouri-Columbia 1996
- Duncan, Patti L 2008 Associate Professor Women Studies University Honors College Faculty. BA Vassar College 1992; MA Emory University 1996; PHD Emory University 2000
- Dung, Jeremiah K 2012 Assistant Professor Central Oregon Exp Sta. BS Eastern Washington University 2006; MS Washington State University 2009; PHD Washington State University 2012
- Dunham, Susie M 1997 Advisor Fisheries and Wildlife. BS Radford University 1989; MS University of Nevada-Reno 1996; PHD Oregon State University 2003
- Duplaix, Nicole 2006 Instructor Fisheries and Wildlife. BS Universite de Caen 1962; MS Univ of Paris VII 1968; PHD Univ of Paris VII 1981
- Durham, Catherine A 1997 Marketing Economist Associate Professor Food Innovation Center. BS Univ of California-Davis 1981; MS University of Arizona 1985; PHD Univ of California-Davis 1991
- Duringer, Jennifer M 1995 Research Associate Enviro/Molecular Toxic. BA Oregon State University 1998; BS Oregon State University 1998; PHD Oregon State University 2003
- Durland, Theodore S 2008 Assistant Professor (Sr Res) Earth, Ocean & Atmo Sci. BS Univ of Hawaii at Manoa 1983; MS Univ of Hawaii at Manoa 2002; PHD Univ of Hawaii at Manoa 2006
- Durski, Scott M 2000 Research Associate Earth, Ocean & Atmo Sci. BS Cornell University 1990; MENG Stevens Institute of Technology 1993; PHD Rutgers University-New Brunswick 2000
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- Dykeman, Cass 1998 Associate Professor College of Education. BA Claremont McKenna College 1984; MED University of Washington 1988; PHD Univ of Virginia-Central Office 1993
- Dziak, Robert P 1988 Professor (Sr Res) CIMRS (Inst/Marine Res). BS Univ of Illinois Central Office 1985; MS University of Memphis 1988; PHD Oregon State University 1997

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- Edwards, John A 1995 Associate Professor Sch of Psychological Sci University Honors College Faculty. BA Davidson College 1983; MA Univ of N Carolina-Charlotte 1989; MA The Ohio State Univ Main 1992; PHD The Ohio State Univ Main 1995
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- Elias, Sabry 1998 Associate Professor (Sr Res) Crop and Soil Science. BS Foreign Institution 1974; MS Michigan State University 1988; PHD Michigan State University 1994
- Elias, Valerie D 1999 Faculty Research Assistant Vet Biomedical Science. BS Michigan State University 1992
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- Evans, T. Matthew 2012 Associate Professor Sch of Civil/Constr Engr. BS University of New Mexico 1997; MS Georgia Institute of Technology 2002; PHD Georgia Institute of Technology 2005
- Eves, Michael 2011 Instructor-ESL INTO OSU Program. BA Western Oregon University 2011; MAT Lee University 2011
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- Falk, John H 2003 Transitional Director College of Education. BA Univ of Cal-Berkeley 1970; MA Univ of Cal-Berkeley 1972; PHD Univ of Cal-Berkeley 1974
- Falk, Kristen 2007 Faculty Research Assistant Forest Eng/Resources/Mgmt. BA Hartwick College 1999
- Falkner, Kelly K 1992 Professor Earth, Ocean & Atmo Sci. BA Reed College 1983; PHD Massachusetts Inst of Technolo 1989
- Faltese, Daniel C 2012 Assistant Professor New Media Communications University Honors College Faculty. BA Concordia College-Moorhead 2006; PHD University of Iowa 2011
- Fan, Yanzhen 2005 Assistant Professor (Sr Res) Biol & Ecol Engineering. BS Harbin Institute of Technology 1995; MENG Harbin Institute of Technology 1997; PHD Harbin Institute of Technology 2000
- Fang, Chong 2010 Assistant Professor Chemistry University Honors College Faculty. PHD University of Pennsylvania 2006
- Fare, Rolf G 1998 Professor Economics. BS Univ of Lund 1967; MS Univ of Lund 1971; PHD Univ of Lund 1976
- Faridani, Adel 1989 Professor Mathematics University Honors College Faculty. BS Foreign Institution 1982; PHD Univ of Munster 1988
- Farsoni, Abdollah T 2003 Assistant Professor Nuclear Engineering. BS University of Tehran 1992; MS Sharif University of Tech 1999; PHD Oregon State University 2006
- Fasth, Becky G 1995 Senior Faculty Research Asst I Forest Ecosyst & Society. BS Univ of Illinois Central Offic 1991
- Fayler, Linda R 1995 Senior Faculty Research Asst I Earth, Ocean & Atmo Sci. BS Montana State Univ-Bozeman 1991
- Fearnside, Jeff 2013 Instructor Sch of Wrtg Lit & Film.
- Fech, William J 2011 Instructor Sch of Wrtg Lit & Film. BA Univ of Nebraska-Lincoln 2008; MA Oregon State University 2013
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- Feibert, Erik B 1990 Senior Faculty Research Asst I Malheur Exp Sta. BS Universidade de Sao Paulo 1980; MA Univ of Cal-Santa Cruz 1988
- Feinberg, David E 1995 Instructor (PAC) Physical ActivityCourses. BA Univ of Cal-Berkeley 1974
- Feldman, Stuart 2013 Instructor Sch of Mech/Ind/Mfg Engr. BS Univ of Michigan-Ann Arbor 1999; MBA Pepperdine University 2006
- Felix, Joel 2006 Associate Professor Malheur Exp Sta. BS Purdue University Main Campus 1990; MS Purdue University Main Campus 1992; PHD Iowa State University 1999
- Felton Rosulek, Laura 2013 Instructor Anthropology. BA Iowa State University 2003; MA Univ of Illinois at Urbana-Cha 2006; PHD Univ of Illinois at Urbana-Cha 2009
- Fennell, Dalicia K 2007 Instructor Sch of Wrtg Lit & Film. BA Oregon State University 2011; MA Oregon State University 2013
- Fentiman, Penny L 2013 Instructor (PAC) Physical ActivityCourses. BS Oregon State University 1979
- Ferguson, Anne Z 1998 Instructor Speech Communication. BS Oregon State University 1989; MAIS Oregon State University 1992

- Fern, Alan P 2004 Associate Professor Sch Elect Engr/Comp Sci University Honors College Faculty. BS University of Maine 1997; MS Purdue University Main Campus 2000; PHD Purdue University Main Campus 2004
- Fern, Xiaoli Z 2005 Associate Professor Sch Elect Engr/Comp Sci University Honors College Faculty. BA Shanghai Jiaotong University 1997; MS Shanghai Jiaotong University 1999; PHD Purdue University Main Campus 2005
- Fernandez, Natalia M 2010 Librarian-Oregon Multicultural Assistant Professor Library. BA University of Arizona 2008; MA University of Arizona 2010
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- Fery, Melissa A 2005 Senior Instructor I Ext Benton County Office. BS Oregon State University 1998; MS Oregon State University 2000
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- Fick, Barbara J 1994 Extension Horticulturist Instructor Ext Benton County Office. BS Univ of Wisconsin-River Falls 1983; MS Univ of Minnesota-Twin Cities 1988
- Fiegenger, Robert 2010 Faculty Research Assistant Institute Natrl Res Dir. BS Humboldt State University 1998; MS Univ of California-Davis 2002
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- Field, Katharine G 1988 Director Bioresources Research. BA Yale University 1975; MA Boston University 1979; PHD University of Oregon 1985
- Fiez, Theresa S 1999 Professor Sch Elect Engr/Comp Sci. BS University of Idaho 1984; MS University of Idaho 1985; PHD Oregon State University 1990
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- Filtz, Theresa M 1998 Associate Professor Pharmacy University Honors College Faculty. BS University of Virginia 1986; PHD University of Pennsylvania 1993
- Finch, David V 1979 Professor Mathematics University Honors College Faculty. BA Swarthmore College 1972; PHD Massachusetts Inst of Technolo 1977
- Finley, Mary C 1997 Instructor New Media Communications University Honors College Faculty. BS Oregon State University 1997; MAIS Oregon State University 2000
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- Fisk, Martin R 1983 Professor Earth, Ocean & Atmo Sci University Honors College Faculty. BS University of Vermont 1969; PHD University of Rhode Island 1978
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- Fitzgerald, Stephen A 1984 Professor Forestry Extension. BS SUNY Coll-Env Sci & Forestry 1979; MS University of Idaho 1983
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- Fleming, Kent D 2011 Instructor Applied Economics. PHD Univ of Mass-Amherst 1991
- Flesh, Barrett 2012 Instructor Acad Prog/Student Aff. BA Macalester College 1984; MS Seattle University 1993
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- Garrett, Amy M 2007 Instructor Ext Benton County Office. BS Indiana University-Bloomington 2003; MS Oregon State University 2009
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- Geller, Bruce L 1987 Professor Microbiology (Science) University Honors College Faculty. BA Michigan State University 1972; PHD University of Utah 1982
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- Gerkey, Andrew 2014 Assistant Professor Anthropology. BA Kenyon College 2002; MA Rutgers University-Newark 2007; PHD Rutgers University-Newark 2010
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- Gerth, William J 1992 Senior Faculty Research Asst I Fisheries and Wildlife. BS Fairfield University 1988; MS Oregon State University 2004
- Gess-Newsome, Julie 2013 Assoc Dean/Healthy People Acad Prog/Student Aff. BA Northland College 1979; MA Univ of Northern Colorado 1982; PHD Oregon State University 1992
- Gess-Newsome, Julie 2013 Professor College of Education. BA Northland College 1979; MA Univ of Northern Colorado 1982; PHD Oregon State University 1992
- Ghasedi, Sarah J 1998 Instructor Sch of Wrtg Lit & Film. BS Oregon State University 2002; MA Oregon State University 2006
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- Giamellaro, Michael 2012 Assistant Professor College of Education. BS University of Wyoming 1997; MA Univ of Colorado-Denver 2004; PHD Univ of Colorado-Denver 2012
- Giannico, Guillermo R 2001 Associate Professor Fisheries and Wildlife. MS University of Victoria 1987; PHD University of British Columbia 1996
- Gibbons, Brady J 2006 Associate Professor Sch of Mech/Ind/Mfg Engr University Honors College Faculty. BS Rensselaer Polytechnic Inst 1992; MS Penn State Univ-Main Campus 1995; PHD Penn State Univ-Main Campus 1998
- Gibbons, Brady J 2006 Associate School Head Sch of Mech/Ind/Mfg Engr University Honors College Faculty. BS Rensselaer Polytechnic Inst 1992; MS Penn State Univ-Main Campus 1995; PHD Penn State Univ-Main Campus 1998
- Gibeaut, David M 2010 Research Associate (Post Doc) Mid-Columbia Exp Sta. BS The Ohio State Univ Main 1981; PHD Univ of Cal-Riverside 1987
- Gibson, Nathan L 2006 Assistant Professor Mathematics University Honors College Faculty. BS Worcester Polytechnic Institut 1998; MS Univ of Tennessee-Knoxville 2001; PHD North Carolina State Univ 2004
- Giebultowicz, Jadwiga M 1995 Professor Zoology University Honors College Faculty. MS Univ of Warsaw 1974; PHD Univ of Warsaw 1981
- Giebultowicz, Tomasz M 1995 Associate Professor Physics University Honors College Faculty. MS Univ of Warsaw 1968; PHD Univ of Warsaw 1975

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- Gillins, Daniel 2012 Assistant Professor Sch of Civil/Constr Engr. BS University of Utah 2005; MS University of Utah 2007; PHD University of Utah 2012
- Gilmour, Bob 2010 Dir-Academic Programs INTO OSU INTO OSU Program. BA Univ of Newcastle-Upon-Tyne 1991; MA Univ of Newcastle-Upon-Tyne 1999
- Giovannoni, Stephen J 1988 Distinguished Professor Microbiology (Science) University Honors College Faculty. BA Univ of Cal-San Diego 1974; MS Boston University 1978; PHD University of Oregon 1984
- Girard Pohjanpelto, Anne-Marie M 1989 Senior Faculty Research Asst I Ctr Excellence Genome Res. BA Carleton College 1986
- Gitelman, Alix I 1999 Associate Professor Statistics (Science). BA Columbia University-NYC 1987; MS Portland State University 1994; MS Carnegie Mellon University 1995; PHD Carnegie Mellon University 1999
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- Goddik, Lisbeth 1993 Professor Food Sci/Tech Extension University Honors College Faculty. BS Oregon State University 1988; MS Cornell University 1990; PHD Oregon State University 1998
- Godwin, Derek C 1992 Professor Ext Marion County Office. BS Virginia Polytechnic Institute 1990; MS Oregon State University 1994
- Godwin, Derek C 1992 Regional Administrator Extension Service Admin. BS Virginia Polytechnic Institute 1990; MS Oregon State University 1994
- Gold, Lana L 2013 Instructor Women Studies. MS Portland State University 2006
- Goldfinger, Chris 1988 Professor Earth, Ocean & Atmo Sci University Honors College Faculty. BA Humboldt State University 1980; MS Oregon State University 1990; PHD Oregon State University 1994
- Gombart, Adrian 2008 Associate Professor Linus Pauling Institute. BS Oregon State University 1986; BS Oregon State University 1989; MS Oregon State University 1994; PHD University of Washington 1994
- Gomez, Angelo 1996 Executive Director Equity and Inclusion. BA Univ of Colorado-Boulder 1975; JD University of Oregon 1978
- Gomez-Diazgranados, Ana 2013 Outreach Program Coordinator Ctr Latino Study&Engagemt.
- Goni, Miguel A 2005 Professor Earth, Ocean & Atmo Sci. BS University of Washington 1986; PHD University of Washington 1992
- Gonnerman, Gregory D 1994 Faculty Research Assistant Enviro/Molecular Toxic. BS Oregon State University 1994
- Gonzalez, Manolete V 2001 Instructor College of Business. BS Ateneo De Manila University 1972; MBA Northwestern University 1974; PHD Univ of Southern California 1985
- Goodall, Cheri P 2002 Faculty Research Assistant Vet Clinical Sciences. BS Washington State University 1990; MS University of New Mexico 1994
- Goodness, Valerie G 2009 Instructor General Agriculture. EDM Oregon State University 2010
- Goodnow, Trischa 1993 Professor Speech Communication University Honors College Faculty. BS Clarion Univ of Pennsylvania 1985; MA Emerson College 1987; PHD Univ of Pittsburgh-Main Campus 1993
- Goodrich, Matthew G 2014 Instructor Music. BMUS Oberlin College 1988; MM University of Washington 1994
- Goodwin, Julia 2007 Instructor History. BMUS Oberlin College 1994; MA Univ of N Carolina-Charlotte 1998; PHD University of Rochester 2007
- Goodwin, Julia 2007 Instructor Music. BMUS Oberlin College 1994; MA Univ of N Carolina-Charlotte 1998; PHD University of Rochester 2007
- Gordon, Jana M 2005 Assistant Professor (Clinical) Vet Clinical Sciences. BS University of Arizona 1993; MS Univ of Illinois at Urbana-Cha 2002; DVM Colorado State University 1998
- Gordon, Jody L 2012 Faculty Research Assistant Sch of Bio/Pop Hlth Sci. BS Oregon State University 2013
- Gorman, Maria E 2006 Assistant Professor (Clinical) Vet Biomedical Science. BS New Mexico St Univ-Main 1991; MS Univ of Illinois at Urbana-Cha 2006; DVM Colorado State University 1997
- Gorman, Michael F 1989 Instructor (PAC) Physical ActivityCourses. MS Oregon State University 1978
- Gosnell, Hannah 2006 Associate Professor Earth, Ocean & Atmo Sci. BA Brown University 1988; BA Univ of Colorado-Boulder 1995; PHD Univ of Colorado-Boulder 2000
- Gottlieb, Evan 2003 Associate Professor Sch of Wrtg Lit & Film. BA Mc Master University 1997; MA SUNY at Buffalo 2000; PHD SUNY at Buffalo 2002
- Gouthu, Satyanarayana 2010 Research Associate Horticulture. BS Andhra University 1984; MS Gujarat Agricultural Univ 1986; PHD Gujarat Agricultural Univ 1994
- Gow, Laura R 2001 Instructor Applied Economics. BS New Mexico St Univ-Main 1995; MS New Mexico St Univ-Main 1997; PHD Kansas State University 2000
- Goyer, Aymeric J 2005 Assistant Professor (Sr Res) Hermiston Exp Sta. BS Univ of Rennes Institut De Ges 1997; MS Foreign Institution 1998; PHD Foreign Institution 2001
- Grabe, Ann 1993 Instructor Music. BS Oregon State University 1981; MA Ithaca College 1986
- Graff, Jason R 2011 Research Associate Ag Botany/Plant Path. BS Univ of Illinois Springfield 1998; BS University of Washington 2003; PHD University of Rhode Island 2010
- Graham, David W 1992 Professor Earth, Ocean & Atmo Sci. BS Florida Inst of Technology 1975; MS University of Rhode Island 1980; PHD Massachusetts Inst of Technolo 1987
- Graham, Matthew 2013 Assistant Professor Physics. PHD Univ of Cal-Berkeley 2010
- Graham Jr, Roger C 1990 Professor College of Business University Honors College Faculty. BS Colorado State University 1973; MS University of Montana 1984; PHD University of Oregon 1990
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- Granger, Autumn V 2002 Advisor-Academic Horticulture. BS University of Oregon 1999
- Granrud, Amanda L 2010 Instructor Speech Communication. BA Carroll College 1994; MA Univ of N Carolina-Chapel Hill 1999
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- Green, Jeremy W 2008 Assistant Professor Ext Crook County Office. BS Vanguard Univ of Southern CA 2005; MS Michigan State University 2007
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- Greenwood, Angela 2007 Instructor (PAC) Physical ActivityCourses. BS Samford University 1991; MS Samford University 1995
- Greenwood, Juliet A 2000 Assoc Dean-Academic/Student Aff College of Science Admin University Honors College Faculty. BS Siena College 1990; PHD Univ of Alabama at Birmingham 1995
- Greenwood, Juliet A 2000 Associate Professor Biochem/Biophysics University Honors College Faculty. BS Siena College 1990; PHD Univ of Alabama at Birmingham 1995
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- Hagen, Tory M 1998 Professor-Endowed Assistant Professor Linus Pauling Institute University Honors College Faculty. BS North Carolina State Univ 1983; PHD Emory University 1990
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- Hagimoto, Yutaka 2000 Instructor (PAC) Physical Activity Courses. BS Oregon State University 1993; MS Colorado State University 1999; PHD Oregon State University 2004
- Hagimoto, Yutaka 2000 Instructor Biol & Ecol Engineering. BS Oregon State University 1993; MS Colorado State University 1999; PHD Oregon State University 2004
- Hagimoto, Yutaka 2000 Research Associate Biol & Ecol Engineering. BS Oregon State University 1993; MS Colorado State University 1999; PHD Oregon State University 2004
- Hahn II, Richard L 2013 Instructor-ESL INTO OSU Program. MA Multnomah College 2012
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- Hakanson, Olivia M 2008 Faculty Research Assistant Fisheries and Wildlife. BS Oregon State University 2012
- Hake, Charisse M 2000 Instructor Mathematics. BA LeTourneau University 1999; MS Oregon State University 2002
- Halbleib, Mary L 1996 Senior Faculty Research Asst I Integrtd Plant Prot (Ag). BS Cal Poly State-San Luis Obispo 1991; MS Washington State University 1995
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- Hale, Jeffrey A 1992 Instructor New Media Communications University Honors College Faculty. BA San Diego State University 1978; BS San Diego State University 1978; MA San Diego State University 1987
- Hales, Burke R 1998 Professor Earth, Ocean & Atmo Sci. BS University of Washington 1988; MS University of Washington 1992; PHD University of Washington 1995
- Haley, Brian A 1998 Assistant Professor (Sr Res) Earth, Ocean & Atmo Sci. BS Univ of Cal-Santa Barbara 1995; MS University of Florida 1998; PHD Oregon State University 2004
- Halischak, Kate 2006 Dir-Student Athlete Acad Svcs Acad Svcs/Stmnt Athletes. BA Bowling Green State University 1976; MA Bowling Green State University 1978; PHD University of Notre Dame 1982
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- Hall, Jean A 1990 Professor Vet Biomedical Science. BS Oregon State University 1981; MS Colorado State University 1987; DVM Washington State University 1982; PHD Colorado State University 1989
- Haller, Merrick C 2001 Associate Professor Sch of Civil/Constr Engr. BS Purdue University Main Campus 1993; MS University of Delaware 1996; PHD University of Delaware 1999
- Hallett, Sascha L 2003 Research Associate Microbiology (Ag). BS University of Queensland 1993; PHD University of Queensland 1998
- Halligan, Dale K 2004 Instructor INTO OSU Program. BA SUNY at Buffalo 1977; MA Azusa Pacific University 1989
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- Hannaway, David B 1979 Professor Crop and Soil Science. BS University of Delaware 1973; MS Univ of Tennessee-Knoxville 1975; PHD University of Kentucky 1979
- Hannigan-Downs, Kimberly S 1995 Assistant Professor (Clinical) Sch of Bio/Pop Hlth Sci University Honors College Faculty. BS Willamette University 1989; MS Indiana State University 1991; PHD Oregon State University 2004
- Hansen, David J 2010 Leader-Sea Grant Ext Program Sea Grant. PHD Iowa State University 1999
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- Harper, Bryan J 2007 Faculty Research Assistant Enviro/Molecular Toxic. BS Arizona State University 1995; MS University of Nevada-Las Vegas 2001
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- Hermann, Anndrea M 2012 Instructor Wood Science/Engr. BS Missouri Southern State Univ 2002; MS University of Manitoba 2008
- Hermes, James C 1987 Ext Poultry Science Spec Associate Professor Animal & Rnglnd Sci Extn. BS Univ of California-Davis 1979; MS Univ of California-Davis 1981; PHD Univ of California-Davis 1988
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- Herring, Peg 2001 Associate Professor Ext/Exp S Communications. BA University of Virginia 1974
- Herring, Peg 2001 Leader - Ed Outreach Ext/Exp S Communications. BA University of Virginia 1974
- Herriott, Kendall 2013 Instructor (PAC) Physical Activity/Courses. BS Texas A&M Univ-College Station 1984
- Hesbrook, Alexandra M 2011 Instructor Sch of Wrtg Lit & Film. BA Colorado College 2008; MFA Oregon State University 2013
- Hesse, Colin R 2013 Assistant Professor Speech Communication. BA Whitworth University 2003; PHD Arizona State University 2009
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- Hicks, John C 2011 Faculty Research Assistant EXT Fam/CommHlth OnCmps. BS Oregon State University 2012
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- Higginbotham, Jack F 1987 Director-Space Programs College of Science Admin. BS Kansas State University 1981; MS Kansas State University 1983; PHD Kansas State University 1987
- Higginbotham, Jack F 1987 Professor Nuclear Engineering. BS Kansas State University 1981; MS Kansas State University 1983; PHD Kansas State University 1987
- Higgins, Adam Z 2000 Assistant Professor Sch of Chem/Bio/Envr Eng University Honors College Faculty. BA Oregon State University 2002; BS Oregon State University 2002; PHD Georgia Institute of Technology 2008
- Higgins, Chad W 2011 Assistant Professor Biol & Ecol Engineering. BS Cornell University-Ithaca 2000; MS Johns Hopkins University 2005; PHD Johns Hopkins University 2007
- Higgins, Christopher C 2000 Professor Sch of Civil/Constr Engr University Honors College Faculty. BS Marquette University 1988; MS Univ of Texas-Austin 1990; PHD Lehigh University 1997
- Higgins, Clay C 2011 Instructor College of Business. MBA University of Oregon 1988
- Higley, Kathryn A 1994 Department Head Nuclear Engineering University Honors College Faculty. BA Reed College 1978; MS Colorado State University 1992; PHD Colorado State University 1994
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- Hilbert, Carey A 1996 Advisor-Head Academic Public Hlth/HumanSci Adm. BS University of Oregon 1992; MS Oregon State University 1994
- Hildenbrand, Kaety R 2002 Senior Instructor I Ext Lincoln Co Office. BS Oregon State University 2003
- Hilker, Thomas 2012 Assistant Professor Forest Eng/Resour/Mgmt. BS Foreign Institution 2000; MS Foreign Institution 2002; PHD University of British Columbia 2008
- Hill, David F 2009 Associate Professor Sch of Civil/Constr Engr. BS Univ of Illinois at Urbana-Cha 1993; MS Univ of Cal-Berkeley 1994; PHD Univ of Cal-Berkeley 1997
- Hill, Eric R 1997 Senior Instructor I Univ Honors College University Honors College Faculty. BA Univ of Southern California 1993; MA Oregon State University 1999
- Hillyer, Charles C 1998 Assistant Professor (Sr Res) Biol & Ecol Engineering. BS Mississippi State University 1996; PHD Oregon State University 2011
- Hilton, Richard J 1987 Senior Faculty Research Asst I Southern Oregon Exp Sta. BA Pomona College 1981; MS Univ of California-Davis 1987
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- Hitzhusen, Verlee K 2008 Instructor Acad Prog/Student Aff. BS Univ of Maryland-College Park 1974; MS Univ of Missouri-Columbia 1989
- Ho, Chenhui 2001 Instructor Foreign Langs and Lits. BA Beijing Normal University 1983; EDM Oregon State University 2008
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- Ho, Emily 2002 Professor Sch of Bio/Pop Hlth Sci University Honors College Faculty. BS University of Guelph 1995; PHD The Ohio State Univ Main 2000
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- Hoffman, Mark A 2000 Associate Dean Public Hlth/HumanSci Adm University Honors College Faculty. BS Indiana University-Bloomington 1991; MS San Jose State University 1993; PHD Indiana University-Bloomington 1997
- Hoffman, Mark A 2000 Associate Professor Sch of Bio/Pop Hlth Sci University Honors College Faculty. BS Indiana University-Bloomington 1991; MS San Jose State University 1993; PHD Indiana University-Bloomington 1997
- Hoffman, Peter D 1987 Senior Faculty Research Asst I Enviro/Molecular Toxic. BS Oregon State University 1988
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- Holden, Madronna 1998 Instructor Women Studies. BA Saint Martin's University 1968; MA The New School 1971; PHD The New School 1974
- Holdren, George R 1987 Assoc Vice President-Research VP for Research. BS Carnegie Mellon University 1971; PHD Johns Hopkins University 1977
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- Horneck, Donald A 2000 Professor Ext Umatilla Co Office. BA Monmouth College 1980; MS Univ of Illinois at Urbana-Cha 1984; PHD Oregon State University 1995
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- Ito, Matthew K 2005 Professor Pharmacy. D PHAR Univ of Southern California 1986
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- Kent, Adam J 2002 Professor Earth, Ocean & Atmo Sci. BS University of New England 1989; PHD Australian National University 1994
- Kent, Michael L 1999 Professor Microbiology (Science) University Honors College Faculty. BS Humboldt State University 1977; MS San Diego State University 1981; PHD Univ of California-Davis 1985
- Keon, Dylan B 1997 Research Associate Sch Elect Engr/Comp Sci. BS Western Michigan University 1993; MS Oregon State University 2001; PHD Oregon State University 2013
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- King, Valery G 1987 Associate Professor Library. BA University of Oregon 1977; MLS University of Oregon 1978
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- Matsumoto, Haruyoshi 1991 Assistant Professor (Sr Res) CIMRS (Inst/Marine Res). BS Tokai University 1976; MS Univ of Hawaii System 1978; PHD Univ of Hawaii System 1984
- Matthewson, Melissa 2006 Instructor Horticulture Extension. BA Univ of Cal-Santa Cruz 1999; MS University of Montana 2005
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- Monaco, Elisa 2012 Research Associate Enviro/Molecular Toxic. BS Foreign Institution 2003; PHD Foreign Institution 2007
- Montagne, Paul E 1994 Faculty Research Assistant Sch of Civil/Constr Engr. BS University of Oregon 1985
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- Moore, Karlie J 2004 Instructor Sch of Bio/Pop Hlth Sci. MS Cal State Univ-Long Beach 2008; PHD Oregon State University 2012
- Moore, Mark P 1990 Professor Speech Communication. BA Cal State Univ-Fresno 1976; MA Cal State University-East Bay 1980; PHD Indiana State University 1984
- Moore, Randall P 2002 Instructor Fisheries and Wildlife. BS Cornell University 1987; MS George Mason University 1995; PHD Oregon State University 2005
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- Mueller, Ryan S 2012 Assistant Professor Microbiology (Science). BS Virginia Polytechnic Institute 1999; PHD Univ of Cal-San Diego 2007
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- Neyland Jr, Michael D 2012 Instructor INTO OSU Program. BA Evergreen State College 2001; MED Framingham State College 2007
- Ng, Ean 2012 Instructor Sch of Mech/Ind/Mfg Engr University Honors College Faculty. BS Montana State Univ-Bozeman 2002; MS Texas Tech University 2004; PHD Texas Tech University 2010
- Ng, Kok-Mun 2013 Professor College of Education. BS Univ of Malaya 1985; MED University of North Texas 1996; PHD Texas A&M Univ-Commerce 1999
- Nguyen, Thinh P 2004 Associate Professor Sch Elect Engr/Comp Sci. PHD Univ of Cal-Berkeley 2003
- Nichols, Christopher M 2012 Assistant Professor History University Honors College Faculty. BA Wesleyan University 2000; MA University of Virginia 2002; PHD University of Virginia 2008
- Nichols, Jane M 2003 Associate Professor Library University Honors College Faculty. BA Univ of Wisconsin-Madison 1989; MLS Dominican University 2001
- Nicolalde, Roberto J 1999 Instructor Sch of Mech/Ind/Mfg Engr.
- Nielsen, Roger L 1988 Professor Earth, Ocean & Atmo Sci University Honors College Faculty. BS University of Arizona 1976; MS University of Arizona 1978; PHD Southern Methodist University 1983
- Niemeyer, Lindsay D 2014 Consultant-Academic Advisor College of Business. BS Northwest Missouri St Univ 2005
- Nieukirk, Sharon L 1998 Senior Faculty Research Asst I CIMRS (Inst/Marine Res). BS Guilford College 1981; MS Oregon State University 1992
- Nishihara, Janet S 1981 Director-EOP Educ Opportunities Prgm. BS Oregon State University 1978; MED Oregon State University 1983; PHD University of Oregon 2002
- Noakes, David L 2005 Professor Fisheries and Wildlife. BS University of Western Ontario 1968; MS University of Western Ontario 1966; PHD Univ of Cal-Berkeley 1971
- Noble, Brie 2012 Faculty Research Assistant Pharmacy. BS Arizona State University 2004
- Nolan, Mary 2006 Instructor Anthropology. BA Oregon State University 1992; MA Oregon State University 1994
- Nolin, Anne W 2002 Professor Earth, Ocean & Atmo Sci. BA University of Arizona 1980; MS University of Arizona 1987; PHD Univ of Cal-Santa Barbara 1993
- Noller, Jay S 2000 Assoc Dept Head Professor Crop and Soil Science. BS Cal State Univ-Los Angeles 1982; MS Cal State Univ-Los Angeles 1984; PHD Univ of Colorado-Boulder 1993
- Nonogaki, Hiroyuki 2000 Associate Professor Horticulture University Honors College Faculty. BS Yokohama National University 1986; PHD Tokyo University Agri & Tech 1996
- Nonogaki, Mariko 2011 Faculty Research Assistant Horticulture.
- Norcross, Emily C 2011 Instructor Sch of Bio/Pop Hlth Sci. MA Univ of N Carolina-Chapel Hill 2003
- Norcross, Marc 2011 Assistant Professor Sch of Bio/Pop Hlth Sci University Honors College Faculty. BS Boston University 2001; MA Univ of N Carolina-Chapel Hill 2003; PHD Univ of N Carolina-Chapel Hill 2011
- Novak, Mark 2002 Assistant Professor Zoology. BA Cornell University-Ithaca 2000; PHD University of Chicago 2008
- Noxel, Sherri A 2007 Director-AFBP College of Business. BS University of Florida 1985; MS University of Florida 1987; PHD The Ohio State Univ Main 2000
- Nyarko, Afua A 2004 Assistant Professor (Sr Res) Biochem/Biophysics. BS Foreign Institution 1991; PHD Ohio University-Main Campus 2005
- Nye, Robert A 1994 Instructor History. BA San Jose State University 1964; MA Univ of Wisconsin-Madison 1965; PHD Univ of Wisconsin-Madison 1969
- Nyers, Alexander J 1999 Faculty Research Assistant Anthropology.
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- O'Malley, Michael J 2000 Instructor College of Education. MED Harvard University 1990
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- Odden, Michelle 2011 Assistant Professor Sch of Bio/Pop Hlth Sci. BS Northwestern University 2000; MS Univ of Cal-Berkeley 2006; PHD Univ of Cal-Berkeley 2009
- Oester, Paul T 1979 Professor Ext Union County Office. BS Oregon State University 1972; MS Oregon State University 1977
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- Ohrn, Amanda K 2010 Faculty Research Assistant Crop and Soil Science. BS Oregon State University 2010
- Olarra, Jennifer A 2006 Advisor-Academic Zoology. BS Oregon State University 1997; MS Oregon State University 2010; MS Oregon State University 2013
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- Olson, Keith V 2013 Faculty Research Assistant Sch of Chem/Bio/Envr Eng. BS Oregon Inst of Technology 1991; BS Portland State University 2009; MS Portland State University 2012

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- Olyaei, Ali S 1999 Professor Pharmacy. BS Oregon State University 1988; D PHAR Univ of Kansas Medical Center 1991
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- Osborne, James P 2006 Associate Professor Food Science and Techno University Honors College Faculty. BS Massey University 1998; MS Massey University 2000; PHD Washington State University 2005
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- Pereira, Cheryl B 1987 Advisor-Academic College of Science Admin. BS Portland State University 1978
- Pereira, Clifford B 1984 Instructor Statistics (Science). BA Reed College 1973; MS Portland State University 1978; PHD Oregon State University 1985
- Pereira, Clifford B 1984 Research Associate Statistics (Ag). BA Reed College 1973; MS Portland State University 1978; PHD Oregon State University 1985
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- Perez, Viviana I 2011 Assistant Professor Biochem/Biophysics. PHD Universidad de Chile 2004
- Perry, David A 1977 Instructor Forest Ecosyst & Society. PHD Montana State Univ-Bozeman 1974
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- Peters, Patrick J 2001 Instructor Sch of Wrtg Lit & Film. BS Oregon State University 2001; MFA Oregon State University 2003
- Petersen, Christoffer E 1995 Senior Faculty Research Asst I Library. BS Oregon State University 1999
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- Peterson, Fox S 2010 Instructor Crop and Soil Science. BA University of Georgia 2006; MS Clemson University 2010; PHD Oregon State University 2012
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- Peterson, Isaac 2013 Instructor Acad Prog/Student Aff. BFA Southern Oregon University 2001; MFA Univ of Cincinnati Main 2005
- Peterson, Jack 2013 Instructor Mathematics. BS University of Georgia 2004; BS University of Georgia 2007; PHD Univ of Cal-San Francisco 2012
- Peterson, Jay O 2003 Research Associate CIMRS (Inst/Marine Res). BS Univ of Wisconsin-Madison 1990; MA Univ of Texas-Austin 1995; PHD Oregon State University 2005; PHD Univ of Mass-Boston 2005
- Peterson, Kate L 1999 Asst Provost-Enrollment Mgmt Asst Prov Enrollment Mgmt. BA Washington State University 1976; MED University of Idaho 1999
- Peterson, Matthew R 2008 Faculty Research Assistant Ctr Excellence Genome Res. BS Univ of Wisconsin-Madison 1999
- Peterson, Rebecca C 2012 Faculty Research Assistant Microbiology (Ag). MS University of Georgia 2005
- Peterson, Scott L 2000 Senior Instructor I Mathematics University Honors College Faculty. BS University of Sioux Falls 1982; MS Utah State University 1986
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- Pfeiffer-Herbert, Anna S 2012 Research Associate (Post Doc) Earth, Ocean & Atmo Sci. BA Carleton College 2001; MS Univ of Cal-Santa Cruz 2005; PHD University of Rhode Island 2012
- Pflugfelder, Ehren H 2012 Assistant Professor Sch of Wrtg Lit & Film. BS Slippery Rock Univ of Penn 2001; MA Case Western Reserve Univ 2005; PHD Purdue University Main Campus 2012
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- Pilolla, Kari D 2005 Research Associate (Post Doc) EXT Fam/CommHlth OnCmps. MS San Diego State University 2002; PHD Oregon State University 2013
- Pipenko, Elena 2012 Instructor INTO OSU Program. BS Foreign Institution 2008; MED Eastern Washington University 2010
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- Pittman, Randall 2011 Faculty Research Assistant Sch of Civil/Constr Engr. BS Grove City College 2007
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- Platt, Carolyn 2005 Instructor Acad Prog/Student Aff. BA Occidental College 1976; MA Stanford University 1984; PHD Stanford University 1989
- Plaza, Dwaine E 1997 Professor Sociology. BA York Universite 1987; MS York Universite 1990; PHD York Universite 1996
- Pohjanpelto, Petri J 1989 Professor Mathematics University Honors College Faculty. PHD Univ of Minnesota-Twin Cities 1989
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- Pollard, Christine D 2011 Associate Professor Sch of Bio/Pop Hlth Sci. BA Azusa Pacific University 1991; MS Pacific University 1998; PHD Univ of Mass-Amherst 2003
- Poppino, Richard R 1995 Associate Professor Music. BA San Francisco Cons of Music 1975; MM Southern Methodist University 1977
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- Porter Medina, Jose D 2001 Associate Professor Sch of Mech/Ind/Mfg Engr. MS ITESM Monterrey 1994; MS Univ of Pittsburgh-Main Campus 1999; PHD Univ of Pittsburgh-Main Campus 2000
- Poulsen, Keith P 2012 Assistant Professor Vet Clinical Sciences. BS Univ of Wisconsin-Madison 2000; DVM Univ of Wisconsin-Madison 2004; PHD Univ of Wisconsin-Madison 2012
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- Prahl, Fredrick G 1984 Professor Earth, Ocean & Atmo Sci University Honors College Faculty. BS University of Kentucky 1975; MS University of Washington 1978; PHD University of Washington 1982
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- Proper, Scott C 2001 Research Associate Sch of Mech/Ind/Mfg Engr. BS Montana State Univ-Bozeman 2000; PHD Oregon State University 2009
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- Pscheidt, Jay W 1988 Professor Ag Botany/Plant Path. BS Univ of Wisconsin-Madison 1980; MS Univ of Wisconsin-Madison 1983; PHD Univ of Wisconsin-Madison 1985
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- Pugatch, Todd M 2011 Assistant Professor Economics. MA Univ of Michigan-Ann Arbor 2003; PHD Univ of Michigan-Ann Arbor 2011
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- Reesman, Dodi 1975 Advisor-Academic Animal & Rnglnd Sciences.
- Reeves, Genna F 2008 Instructor College of Business. BS New Mexico St Univ-Main 2006; MS Colorado State University 2008; PHD Oregon State University 2012
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- Reimer, Jeffrey J 2005 Associate Professor Applied Economics. BS Univ of Illinois at Urbana-Cha 1994; MS Univ of Illinois at Urbana-Cha 1999; PHD Purdue University Main Campus 2003
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- Reinert, David E 1979 Senior Faculty Research Asst I Earth, Ocean & Atmo Sci. BS Oregon State University 1973
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- Reitz, Stuart 2012 Professor Ext Malheur Co Office. BS University of South Alabama 1985; MS Clemson University 1988; PHD Clemson University 1994
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- Reyes, Victor J 2011 Instructor INTO OSU Program. BA Pitzer College 2003; MA San Francisco State University 2006
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- Rudolph, Jenny M 2004 Instructor Ext Columbia Co Office. BA University of Oklahoma Norman 2002; MPA Portland State University 2009
- Rueck, Scott 2010 Head Coach-Women's Basketball Intercolleg Athletics. MS Oregon State University 1992
- Ruggiero, Peter 2006 Associate Professor Earth, Ocean & Atmo Sci. BS Lehigh University 1991; MS Oregon State University 1993; PHD Oregon State University 1997
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- Russell, Beth A 2002 Instructor- ESL INTO OSU Program. BA Whitman College 1995; MA Oregon State University 1999; MFA Pacific University 2008
- Russell, Douglas E 1982 Senior Faculty Research Asst I Art. BS James Madison University 1974
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- Russo Kelly, Miriah M 2009 Instructor Speech Communication. BA Central Connecticut State Univ 2004; MS Catholic University of America 2008
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- Rutberg, Leslie A 2011 Instructor Sch of Wrtg Lit & Film. BA Univ of Cal-Berkeley 2004; MFA University of Oregon 2006; MS University of Oregon 2011
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- Samano, Vivian L 2012 Instructor INTO OSU Program. BA Univ of Cal-Berkeley 2000; MED Framingham State College 2008
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- Sexton, Nathan M 2002 Instructor (PAC) Physical Activity Courses. BS Oregon State University 2009
- Seymour, Ron 2006 Instructor New Media Communications. BA St Olaf College 1974; MDIV Luther Seminary 1999; JD John Marshall Law School 1980
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- Sharp, Shayla B 2004 Instructor Sociology. BS City University of Seattle 1996; MS Oregon State University 2001
- Sharpton, Thomas J 2002 Assistant Professor Microbiology (Science). BS Oregon State University 2003; PHD Univ of Cal-Berkeley 2009
- Shaw, David C 2005 Associate Professor Forest Eng/Resources/Mgmt. BS Northern Arizona University 1977; MS Western Washington University 1982; PHD University of Washington 1991
- Shaw, Susan M 1996 Director - SLCS Liberal Arts Admin University Honors College Faculty. MA Southern Baptist Theological S 1983; PHD Southern Baptist Theological S 1987
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- Shay, Alan 2008 Instructor Horticulture. BS Oregon State University 1991; MS Oregon State University 2010
- Shay, Neil F 2010 Professor Food Science and Techno. PHD University of Florida 1990
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- Shearman, R Kipp 1994 Associate Professor Earth, Ocean & Atmo Sci. BS Univ of Colorado System 1993; PHD Oregon State University 2000
- Sheehan, Elizabeth M 2012 Assistant Professor Sch of Wrtg Lit & Film. BA Yale University 2002; MA University of Virginia 2006; PHD University of Virginia 2011
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- Sheldrick, Sarah A 2000 Instructor Speech Communication. BS Oregon State University 2006; MA Oregon State University 2009
- Sheldrick, Susanna 2010 Instructor INTO OSU Program. MS Oregon State University 1990
- Shell, Karen M 2006 Associate Professor Earth, Ocean & Atmo Sci University Honors College Faculty. BS Harvey Mudd College 1996; PHD Univ of Cal-San Diego 2004
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- Sherwood, Dawn M 2007 Assistant Professor Animal & Rnglnd Sciences University Honors College Faculty. BS Texas Tech University 1994; MS Texas Tech University 1997; PHD Univ of Nebraska-Lincoln 2007
- Shinderman, Matthew J 2004 Senior Instructor I Acad Prog/Student Aff. BS James Madison University 1995; MS Utah State University 1999
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- Shriver, Ann L 1986 Instructor Applied Economics. BS Georgetown University 1979; MS Michigan State University 1984
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- Stanley, John D 1991 Senior Faculty Research Asst I Earth, Ocean & Atmo Sci. MS Michigan State University 1982
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- Stein, David A 2008 Faculty Research Assistant Vet Biomedical Science. BS Oregon State University 1981
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- Stemper, David M 1999 Instructor Forest Ecosyst & Society. BS Univ of Minnesota-Twin Cities 1998; MS Univ of Minnesota-Twin Cities 1997
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- Stephenson, Garry O 1986 Professor Crop and Soil Science. BS Arizona State University 1977; MAIS Oregon State University 1980; MAG Oregon State University 1988; PHD University of Oregon 2006
- Sterling, Marcus R 2003 Instructor (PAC) Physical Activity Courses. BS Oregon State University 2010
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- Sterner, Ruth K 2007 Coord-First Year Experience NewStdPrgs&FamOutreach. BA Colorado State Univ-Pueblo 2002; EDM Oregon State University 2009

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- Stewart Donaldson, Carla J 2012 Instructor Acad Prog/Student Aff. BS Northern Arizona University 1973; MS Oregon State University 1995; PHD Oregon State University 2012
- Stieger-Vanegas, Susanne 2008 Assistant Professor Vet Clinical Sciences. MS Foreign Institution 1995; DVM Foreign Institution 1998; PHD Univ of California-Davis 2007
- Still, Christopher J 2012 Assistant Professor Forest Ecosyst & Society. BS Colorado State University 1993; PHD Stanford University 2000
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- Stone, Robert B 2009 School Head Sch of Mech/Ind/Mfg Engr University Honors College Faculty. BS Missouri Univ of Sci & Tech 1992; MS Missouri Univ of Sci & Tech 1995; PHD Univ of Texas-Austin 1997
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- Streit, Kelly J 2011 Instructor Ext Clackamas Co Office. BS Oregon State University 1983; MS Univ of Tennessee-Knoxville 1986
- Strik, Bernadine C 1987 Ext Horticulturist-Berry Professor Horticulture Extension. BS University of Victoria 1983; PHD University of Guelph 1987
- Strong, Nicole A 2004 Senior Instructor I Forestry Extension. BS Purdue University Main Campus 1997; MS Penn State Univ-Main Campus 2003
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- Sugden, Laura C 2009 Instructor Acad Prog/Student Aff. BS Univ of California-Davis 1994; MA Seattle University 2002
- Sullivan, Dan M 1995 Associate Professor Crop and Soil Science. BS Oregon State University 1977; MS Oregon State University 1981; PHD Kansas State University 1990
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- Thompson, Sara Q 2003 Instructor Acad Prog/Student Aff. BS Eastern Oregon University 2002; MS Univ of Illinois at Urbana-Cha 2009
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- Thorburn, Sheryl A 2002 Professor Sch of Soc/Bhav Hlth Sci University Honors College Faculty. BA Oregon State University 1984; MA Univ of Cal-San Diego 1985; MPH Univ of Cal-Berkeley 1990; PHD Univ of N Carolina-Chapel Hill 1993
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- Titus, Mathew W 2010 Instructor Mathematics. BA Willamette University 2009; MS Oregon State University 2013
- Todd, Allison 2012 Advisor-Academic College of Business. BS Iowa State University 2010; MA University of Kansas 2012
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- Tornquist, Susan J 1996 Professor Vet Biomedical Science University Honors College Faculty. BA Michigan State University 1975; BS University of New Mexico 1980; MS University of New Mexico 1987; DVM Colorado State University 1985; PHD Washington State University 1996
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- Trempey, Janine E 1989 Professor Microbiology (Science) University Honors College Faculty. BS Kansas State University 1980; PHD U of Texas Health Science 1985
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